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ORIGINAL ARTICLES.

ORRHOTHERAPY IN DIPHTHERIA.[1]

Read before the Illinois State Medical Society, May, 1896.

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CHICAGO.

As a result of the work of Pasteur and the numerous investigations which have followed in the same line, it is now generally believed by bacteriologists that many diseases, especially those which seldom affect individuals more than once, are self-limited by the formation within the blood of a product capable of destroying the toxic material that excites the disease, hence called antitoxin. In such diseases if life be prolonged until a sufficient quantity of the antitoxin has been developed the toxic agent is destroyed and recovery follows if no serious complications have arisen.

In diseases that can be communicated from man to animals and vice versa, such for example as rabies, anthrax and diphtheria, advantage has been taken of this fact by inoculating animals with the attenuated toxic principle in small but steadily increasing quantities until an antitoxin is developed in the blood in sufficient quantity to render the animal immune to the further pernicious effects of the contagium.

Behring enunciated the law that blood serum which had in this manner been rendered immune might be transferred to another individual with the effect of rendering the latter also immune, no matter how suscepticle he might be to the disease. Further investigations by Kitasato, Aronson, Roux and Behring have determined what animals have blood serum that produces the least ill effects when introduced into the human system, and how to render a small quantity of blood capable of producing immunity in a second individual. They have also discovered methods of preserving the serum and of measuring its strength and purity.

Diphtheritic poison has been introduced into animals, preferably into the horse, until immunity to its further effects has been obtained. The animal has then been bled, the blood allowed to separate and the serum preserved under the name of antitoxin.

Until recently the serum prepared by Aronson, Behring and the New York Health Department was of strength known as from 60 to 150 antitoxin units to the cubic centimeter, the different preparations being numbered 1, 2 and 3. Stronger preparations are now made; No. 4 representing 200 antitoxin units; No. 5, 300 units, and No. 6, 400 units to the cubic centimeter. These are obtained, not by concentration of weaker solutions, but directly from the animal that has been inoculated. The stronger preparations are considered quite as safe and are preferable on account of their smaller bulk which obviates to a considerable degree the pain caused by the large injections.

[1] See correspondence, page 49.

One thousand antitoxin units is considered the ordinary curative dose, but in severe cases or those not treated until the third day, 1,500 to 2,000 units are often employed, and sometimes these are repeated until altogether from 4,000 to 6,000 units are administered in a single case. The dose considered necessary for immunizing a healthy individual is about one-fourth the curative dose. The serum is administered by hypodermic injections, preferably in some part of the body where there is an abundance of loose cellular tissue, as at the lower angle of the scapula, in the gluteal region, and upon the abdominal or chest walls. Dr. Chantemesse (*New York Medical Record*, 1896) reports that he has had quite as good results when administering the antitoxin per rectum as by hypodermic injections.

It is generally believed that the earlier the injection is made the better the result; still the classification of cases by days to determine the prognosis and the size of the dose is at fault for there is much difference in individuals in the rapidity with which absorption of toxins takes place and in their resisting power to the poison; therefore, in some, injections made the fourth or fifth day might be quite as advantageous as those in others made on the first day, though the earlier the remedy is used the better the result that would commonly be expected. The rapidity of the accession, the general condition and the age of the patient are of more importance in determining the use of the serum, its dose, and the prognosis to be given than is the number of days since the onset of the disease.

Very little interest was manifested in the antitoxin treatment of diphtheria until 1894, after Roux had presented the subject to the International Congress of Hygiene at Buda-Pesth with the report of five hundred cases treated by this method. Since then many physicians and the health departments of cities and of national governments have employed the serum extensively in the treatment of this disease. Although no crucial experiments have been made to determine the value of diphtheria antitoxin yet the statistics obtained from many sources *seem* to prove that it is capable of greatly diminishing the mortality of this disease. In studying the literature of this subject I find the majority of reports have been from many physicians who have recorded only one or two cases. From a perusal of these one can not help suspecting that in many instances only the favorable cases have been recorded. The statistics of hospitals are probably more complete and accurate, but the statistics of Health Boards although more extensive are likely to be very inaccurate for many reasons.

In Dr. Foster's report, No. 7, of the accompanying various hospital reports and published records which I have obtained (see Table I), it was noted that all of the cases treated on the first day recovered; of those treated on the second day 9.3 per cent. died; of

those treated on the third day 20 per cent. died; of those treated on the fourth day 33 per cent. died.

The following points were noted in the report from the London Hospitals (No. 12): First, that there was a great reduction in mortality in cases treated on the first and second days by antitoxin, second a lowering in mortality in all ages to a point below that of any preceding year, and third a lowering of the mortality of laryngeal cases over the preceding year.

In a personal letter (report No. 13) received from Dr. Wm. M. Welch of Philadelphia regarding the statistics from the Municipal Hospital of that city, I find that the use of antitoxin was mainly limited to cases considered favorable that were admitted in the early stage of the disease, that is, somewhere from the first to the fourth day. In cases that were far advanced, many of which were in a hopeless condition or showed great malignancy when they were admitted to the hospital, the antitoxin was not employed and a large number of the cases which received the antitoxin in the early stages were not severe. Of 302 cases receiving antitoxin 51 or 16.8 per cent. were intubation cases; of the 404 cases which did not receive antitoxin 71 or 17.57 per cent. were intubation cases. Of the 51 intubation cases which received antitoxin 27 or 52.94 per cent. died, while of the 71 cases in which it was not received 40 or 56.33 per cent. died. The difference, therefore, in favor of antitoxin in intubation cases amounted to only 3.39 per cent. notwithstanding the greater malignancy of the disease in some of these. In this series of cases the antitoxin was given to those in which it is claimed to be most beneficial, and was not given to the worst cases. Had the antitoxin been given in alternate cases of this group half of the more serious cases that died without the serum would probably have died with it, or at least they would not have been counted against other methods and this series would therefore have shown a record for antitoxin considerably more unfavorable than it does now.

An analysis of these reports shows that Nos. 1, 2, 3, 4, 5, 6, 7, 9 and 14 are very favorable to the use of antitoxin, but the cases reported in No. 7 were made up from journals and as already stated many of the reports so obtained were open to the suspicion of not having been accompanied by the unfavorable reports which should have been published at the same time. The observations Nos. 10 and 11 are from the Boards of Health of large cities and are very unreliable for the reason that many physicians do not report cases of diphtheria at all until they fear the patient is going to die, whereas physicians who obtain antitoxin from the Board of Health would necessarily report nearly all cases where it is to be employed. It is therefore not at all improbable that the percentage of mortality as given for cases in which antitoxin was not used is two or three times larger than it should be. There are other reasons, well known to the profession, why statistics obtained from this source are peculiarly unreliable.

In observations Nos. 4, 5, 6 and 9 the mortality among patients treated by antitoxin is compared with that of patients not treated by antitoxin in previous years, and as has already been stated the mortality varies so greatly in different years, whatever the treatment, that very little information can be derived from such statistics. Observation No. 12 is

TABLE I.

No.	Place of observation.	Treated by Antitoxin.			Not treated by Antitoxin.			
		Date of Observation.	Number of cases.	Per cent. of Mortality.	Date of Observation.	Number of Cases.	Per cent. of Mortality.	References.
1 cf. 8	Kaiserin Friedrich Hospital	1894	303	13.2	1894	230	47.	New York Med. Record, 1895.
2	Trousseau Hospital	1894	230	14.7				"
3	Willard Parker Hospital	1894 to Apr. 1895	164	27.				"
4	Hospital for Children, Paris	1894	?	24.23	1890 to 1894		51.11	"
5	Trousseau Pavilion				1894	520	60.7	"
6	Germany—Hospitals and Private Practice, reported by Dr. Enlenberg	1894 and 1895	10,240	under 2 yrs. 21. 2 to 10, 8.8 over 10 yrs. 4.7	Previous to 1894		39. 15. 8.8	JOURNAL AMER. MED. ASS'N.
7	Collected from journals by Dr. Foster of Washington	To Febru'ry 1895.	2,740	18.5	Same period.	4,445	47.36	Phila. Medical News, 1895.
8	Berlin observations by Professor Behring	1895	5,800	9.6	1895	4,479	14.	JOURNAL AMER. MED. ASS'N.
9	Russia—Dr. Zabalatini	1895	109	12.8	Previous records.		48.	
10	New York—Dr. Louis Fisher	1895	200	15.				New York Med. Record, 1895.
	New York Board of Health	1895	225	15.				Health Report.
11	Chicago Board of Health	1895	629	6.12				British Medical Jour., Apr., 1896
12	Hospitals of London, Joint Report	1895	Laryngeal cases, 461	42.	1894	Laryngeal cases, 466	62.	JOURNAL AMER. MED. ASS'N and private letter.
13	Municipal Hospital, Philadelphia, reported by Dr. Wm. M. Welch	1895	302	28.14	1895	404	25.99	Jour. Laryngology, Apr., 1896.
14	Professor Von Ranke		103	18.	Previous 8 years.		35.	"
15	Mr. Lennox Browne, Northwestern Fever Hospital, London	1894	100	27.			27.	

favorable to the antitoxin treatment on its face but it will be observed that the cases treated by antitoxin were in 1895 and those not treated were in 1894. Behring's statistics, Observation No. 8, show that in Berlin diphtheria was very much less fatal in 1895 than in the previous years even when antitoxin was not employed, the ratio apparently being about 14 to 40 or 50. If a similar ratio were maintained in London for the two years of observation, No. 12 instead of being favorable to the antitoxin treatment is decidedly unfavorable; the same remark would apply to some of the other observations, where the comparison has been between different years. No. 15 can hardly be considered favorable.

As an immunizing agent it is claimed that one-fourth the curative dose is efficient and that the larger the dose given the longer the immunity, but that repeated small doses are even more effectual. The immunity is said to last from one week to thirty days. Out of ten thousand cases thus treated at Berlin only one contracted diphtheria. As reported in the Annual of the Universal Medical Sciences for

1892 Grancher of Paris stated that in a diphtheritic ward in Paris among 1,741 patients admitted there were 153 children that did not have diphtheria at the time, yet not one of these contracted the disease. This was before the days of antitoxin, and when it is remembered that the children were surrounded in the same ward by diphtheria these facts detract much from the credit given diphtheritic antitoxin as a prophylactic agent.

Several cases have been reported in which this treatment seems to have proven deleterious to the patient and some fatalities have already occurred. In the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION April 4, 1896, a fatal case is recorded in which a healthy child died within five minutes after the injection had been given to protect it from contagion. Another case with serious symptoms in which a prophylactic dose had been given is reported in the same JOURNAL April 18, and still another fatal case has just been reported from Berlin in which Dr. Langerhans lost his little child shortly after an immunizing injection. Nevertheless considering the large number of injections which have been given and the few reports of deleterious effects it must be admitted that there is but slight danger in using the remedy as a prophylactic.

There is some reason to believe that injurious effects follow its use in remedial doses in many instances but as has been claimed by those who favor the remedy, it is possible that the deleterious effects are often observed from the fact that serious cases that would otherwise have died before the development of sequelæ are saved and that naturally in these cases the unfavorable after-effects of the disease would be more numerous. As stated by Mr. Lennox Browne in his book on "Diphtheria and its Associates," 1895, the power of the serum to do good and per contra its capacity for inflicting injury is in proportion to the duration of the disease, in other words, to the degree of toxemia. He claims that a greater number of children have been found liable to attacks of cyanosis, necessitating a demand for the freer use of nervines and stimulants, also that complete recovery is found to be delayed and that unexpected fatal results at a late period are more frequent. In the joint report of the hospitals of London already quoted 3,040 cases treated in 1894 without antitoxin are compared with 2,182 cases treated in 1895 with antitoxin. These show the following complications:

TABLE II.

	Treated in 1894. Without Antitoxin.		Treated in 1895. With antitoxin.	
	Number of Cases.	Per cent.	Number of Cases.	Per cent.
Albuminuria	603	24.0	1,081	40.9
Nephritis	37	1.2	45	2.0
Paralysis	403	13.0	507	23.0
Pneumonia, lobar	11	.3	18	.8
Pneumonia, lobular	50	1.6	80	3.6
Relapse of diphtheria	28	.9	31	1.4

The above figures show a larger percentage of complications after the antitoxin treatment. The experience in these hospitals showed that by far the most frequent complication was a rash, usually urticarial, sometimes erythematous or having the appearance of scarlatina. A rash was observed in 45.9 per cent. of all cases. This was accompanied by fever in many cases, amounting to 29.6 per cent. of the patients presenting a rash. In some instances the rash persisted for many days, but usually it had run its course by the end of the third or fourth day. There were a a few instances of effusion into the joints and abscesses were found at the site of injection in 2.3 per cent. of the cases.

In an abstract from the discussion at the meeting of the British Medical Association 1895, reported in the *Journal of Laryngology*, April, 1896, Dr. Goodale gave the following statistics, based on his observation: Of 105 cases of diphtheria treated with antitoxin, 29 per cent. died; of 136 cases not so treated, 33 per cent. died; albumin was found in the urine of 53.3 per cent. of the cases treated by antitoxin, but only in 49.2 per cent. of the cases not so treated. Nephritis was not noted in any of the cases; paralysis followed diphtheria in 17 per cent. of the cases treated by antitoxin, and in only 14.7 of the cases treated by other methods. Prof. Von Ranke of Munich gave statistics of 163 cases treated by antitoxin in which there was not a single case of laryngeal stenosis. Dr. A. Baginsky of Berlin gave statistics of 525 cases treated by antitoxin in which there had been no laryngeal stenosis. Dr. C. V. Kahlden (JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Oct. 19, 1895) reports that in numerous experiments on guinea pigs and rabbits that have been injected with very large doses of antitoxin for the body weight of the animal he was unable to find any evidence of nephritis in the animals that were killed after one or more injections.

The consensus of opinion of observers as to the symptoms manifested after curative doses of the antitoxin is that the temperature may be either reduced or rendered higher, though it appears that in the majority of cases it is rendered somewhat lower in the next twelve to twenty-four hours; the pulse is strengthened and the general condition appears to be improved in the same time; extension of the diphtheritic membrane to other parts is checked and the membrane commonly begins to loosen within twenty-four hours. The remedy, however, does not prevent suppuration of the cervical glands, does not prevent paralysis and does not favorably modify paralysis when it has once appeared.

Laboratory experiments have undoubtedly proven that antitoxin, when injected into guinea pigs that have been inoculated with large quantities of diphtheria toxin, saves their lives, and also that immunizing doses in these animals are not followed by bad results, but prevent contagion for a certain period.

The reports of clinical investigations taken as a whole are considerably in favor of the antitoxin treatment. There is still, however, much skepticism as to the efficacy of the remedy, based upon the fact that no crucial experiments have been reported. It is well known that the mortality in diphtheria varies from 10 to 75 per cent. in various epidemics or in different portions of the same epidemic, therefore accurate information can not possibly be obtained by comparing the death rate of any year with that of any preceding year, or even by comparing the death rate of one month with that of preceding or succeeding months. Until, in the large hospitals alternate cases are treated by antitoxin alone and by other methods we will have no certain information upon the subject. The report from the Municipal Hospital of Philadelphia approaches nearer a crucial test than any other that I have been able to find. It unfortunately shows a higher death rate with antitoxin than without it; even

though the antitoxin was given mostly to those cases which were considered to be especially favorable for its action and in extreme conditions it was withheld. Until more definite information is obtained conservative physicians may well be excused for declining to experiment upon their patients with this remedy. However, the wide belief that it does much good and the comparatively certain knowledge that it does but little harm suggests that our duty to our patients demands that when diphtheria exists we should administer the antitoxin if it is desired, but that at the same time we should use such other remedies as have been proven of most value in combating this disease; but we should hesitate to recommend it as a prophylactic agent.

Antitoxin certainly has not been proven a specific for diphtheria. In estimating its value it should not be forgotten that the bacteriologic diagnosis of this disease is not perfect; that in a large percentage of cases having diphtheritic membrane the Klebs-Löffler bacillus is not found and also that in a large percentage of perfectly healthy mouths a bacillus morphologically the same is present.

We believe that experimentation in the treatment of diphtheria by serum is in the right direction and we hope that the enthusiastic friends of orrhotherapy may be largely vindicated, yet we can not search far into the history of medicine to find that very many of the remedies now employed have in the beginning been lauded excessively, and that not a few of those that were formerly supposed to be extremely efficacious have been found to be practically worthless.

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THE OUTLOOK IN SERUM THERAPY.

Read before the Michigan State Medical Society, at Mt. Clemens, June 5, 1896.

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A year ago, in a paper read before this Section, I stated that an average of the reports from serum treatment in diphtheria showed a reduction of 50 per cent. in mortality. I repeat this statement to-day with all confidence. Then we had reports from a few thousand cases, to-day from hundreds of thousands. With the profession at large there is no longer any question as to the value of this treatment. Here and there some belated traveler may be heard crying that we are on the wrong road, that trouble and disappointment alone await us. The observer whose opposition has attracted the widest attention in the past year is possibly Dr. Lenox Brown of London. Dr. Brown is a very able man, an authority on many subjects. He attacks the statistics, makes much of the harmful effects of the serum, and enters a general denial against all the claims of good. The best answer to Dr. Lenox Brown's objections is not a review of all the facts and figures, but the recently issued report of the Medical Superintendents of the Metropolitan Asylum's Board of London. This report covers some six thousand cases of diphtheria treated in these hospitals; in round numbers, 3,000 without and 3,000 with the serum treatment. Their conclusion is, that not less than 250 lives were saved in 1895 by the antitoxin that would have been lost under the old methods of treatment.

There have been some improvements in the production of serum that are worthy of note. A year ago, in a vial of 10 c.c. we thought we had a very good serum, if it contained 1,000 units. Now we have one containing 5,000 units, and I think it altogether probable that by the end of the year we can have a serum of such strength that a 10 c.c. bottle will hold 10,000 units. This is an important advance. To inject 10 c.c. of anything into a child is a heroic procedure. But the injection of 1 or 2 c.c. is quite another matter. Two c.c. of this stronger serum is a full curative dose for an average case; 7 minims is an immunizing dose. There are certain unpleasant complications, urticarias, rheumatic pains, etc., that not uncommonly follow serum injections. In general these are proportional to the amount of serum used. We expect to note a very great diminution in the annoying sequelæ from these stronger serums. Allow me to call your attention to a mistake which I believe many practitioners are making. They argue in this way. "Ten cubic centimeters can be injected without harm. Now if I can get a serum that contains from two to five times the antitoxic power of that I have been using, I will inject the same amount and will get control of the disease in proportion to the strength of the antitoxin." This, I believe, is mistaken reasoning. It is very well established that this serum is not directly antitoxic, *i. e.*, the serum that you give does not of itself destroy the poison. It in some way nourishes or stimulates the cells of the body, and they in turn destroy the toxin. It does not follow, either in theory or in practice, that you will get this needed stimulus better from 5,000 than from 1,000 units. In fact, in so far as I can judge, from a somewhat careful examination of many reports, Behring's original recommendation, 250 units for immunizing, 500 to 600 for mild cases, 1,000 for average, and 1,500 for severe cases, repeated as necessary, still give the best results. On theoretic grounds, I believe that even smaller doses repeated more frequently would give better results. Remember the toxin is not produced all at once, but continuously through the course of the disease, so long as the germs are growing.

The marvelous results obtained in diphtheria very naturally led to enthusiastic work in all microbic diseases. At first it seemed that the same methods could be applied and like results obtained in all of the communicable diseases. And yet, after an enormous amount of work done by careful and skillful investigators, the results obtained are very disappointing. Typhoid and cholera, tuberculosis and smallpox are still unconquered. Why is it that a method applicable to diphtheria will not give as good results when applied to tuberculosis or typhoid? They have similar causes; the germs in these diseases as well as in diphtheria or tetanus can be isolated, pure cultures grown, toxins produced. The chief reason for the failure, I believe, is in this. In an ordinary case of diphtheria there are relatively few germs, confined to a very limited surface. But these germs produce a large amount of a very virulent poison, so much that every tissue of the body may feel its harmful effect. In tetanus this condition is even more pronounced. The germs are confined to the neighborhood of the wound and are so few in number that the skilled bacteriologist must make repeated examinations, or cultures, to find them at all. And yet these few germs will in the average case produce sufficient poison to cause death. How does this compare with tuberculosis, for example? One estimate has it that in the last stages of this disease as many as four billions of the germs

are expectorated in a day. This, I take it, without claiming any exactness for the figures. is a far greater number of germs than is produced in the entire course of a case of diphtheria or tetanus. Yet in pure, unmixed, non-septic tuberculosis, the amount of toxin produced, measured by the temperature curve and general symptoms, is small. To illustrate: Here is a tetanus toxin grown in bouillon from an old and presumably weakened germ, with no attempts to increase its virulence. Of this one five-hundredth c.c. is fatal to guinea pigs. Here is the toxin from the tubercle germ, grown as carefully as can be. This has been concentrated to one-tenth of the original bulk, and yet it requires from 2 to 5 c.c. to kill a guinea pig. At the lowest estimate the tetanus toxin is 10,000 times as strong as that obtained from the tubercle germ. Conversely, it is probably a safe estimate to say that in the average fatal cases of these two diseases, there are a million times as many tubercle germs produced as in the case of tetanus. I believe I am justified in saying that in tetanus it is the toxin that kills, while in tuberculosis it is the germs. The old name consumption is correct, the disease is a literal eating up of the tissues by the germs. Bearing these things in mind, the success of the method in the one case, and its failure in the other can be understood. To cure tetanus we need an antitoxin, while for the cure of tuberculosis we must have a germicide. The antitoxins of tetanus and diphtheria are not germicidal. Such an agent is not needed; free the tissues from the harmful effects of the poisons and they will easily take care of the few germs present. But not so in tuberculosis. Neutralize or destroy all the toxin and you still have left in an advanced case, untold millions of germs, feeding on and literally eating up the tissues in which they are located. I would not say that the toxins in tuberculosis are of no importance, but in an uncomplicated case I think the toxin is relatively unimportant. In the work of the past year these theoretic conclusions have received some experimental proof. Pfeiffer and his assistants in the Berlin laboratory have shown that the blood serum of an animal or man immune to cholera, can help an animal infected with cholera germs, but it does so, not by destroying a toxin, but by killing the germs themselves. Further, that the direct germ-destroying power of this immunized serum is small. But that when injected into the infected animal it so stimulates, or assists the cells, that they or their soluble products can in turn destroy enormous numbers of germs. Pfeiffer illustrates this in the following manner: A drop of the immunized serum is placed in a test tube with a portion of a bouillon culture of the cholera germ. This is left at the body temperature. Exactly similar amounts of serum and culture are injected into the abdominal cavity of a susceptible animal. In another, control animal, an equal quantity of the germ culture is injected without the serum. After a given time the containers, the test tube and the abdominal cavity of the animals, are examined, both microscopically and by the plate method. It is found that a few germs have been killed by the drop of serum in the test tube, while in the animal receiving the mixture the most or all of the germs have been destroyed. In the control animal the germs have increased in number.

Note the exact similarity here, both in theory and in results, to that advocated by Dr. Vaughan and myself several years ago in explaining the action of the nucleins in the body. Results corresponding in general to the above have been obtained with typhoid. Results which go far to show that in these diseases at least curative effects are produced by germ-destroying rather than by antitoxic agents.

A BRIEF SURVEY OF THE VARIOUS SERUMS.

Erysipelas Serum for Malignant Tumors.—There have been a few, apparently well authenticated, cases where an intercurrent attack of erysipelas has markedly benefited, and in a few instances cured malignant neoplasms. Following this indication, several experimenters have inoculated the site of these tumors with the germs of erysipelas, but this procedure proved entirely too dangerous. Whatever the effect on the tumor the patient often died.

Coley then attempted the treatment of these tumors with the toxins of erysipelas. He claimed very favorable results, but in other hands the treatment, although still occasionally used, has not given satisfaction.

Emmerich and Scholl, the former a well-known bacteriologist, conceived the idea of preparing a serum that would antagonize the growth of these tumors. They injected sheep with carefully prepared virulent cultures of the erysipelas germs. These injections were continued for some time. The serum from the sheep was then used for injection into the neoplasms. In theory, they were not attempting to produce an antitoxin, in the sense that we understand that word. Their theory is practically the same that Klebs advances for his antiphthisin. A germ produces both toxic and antitoxic bodies. Although there has been no experimental proof of any such condition, the possibility of its truth seems to have impressed many of the German investigators. Klebs claims that he can take tuberculin and by chemic methods remove the poisonous substances and retain the curative ones. Emmerich and Scholl used the animal body for this purpose. It was to be a separating filter, the poisonous substances eliminated and the anti-poisons or toxins stored in the blood of the injected animal. By repeated injections, a large amount of these curative bodies could be stored in the blood and this in turn used for the treatment of disease in man. These authors believed that they had found a specific cancer (heilserum), and notwithstanding the failure of the remedy in the hands of Bruns, Czerny, Petersen, Reinebroth and others, they persist in asserting that the serum does cure, and in this they are supported by a few clinicians. Bruns thinks it probable that in case there is amelioration, it is not due to any specific action, but results from the fever induced, causing fatty degeneration, and cites numerous instances of neoplasms degenerating in other fevers, as in typhoid, meningitis, etc.

Other experimenters have injected extracts or suspensions of tumors into animals, and then used their serum for injections. There is little promise in this work. For the present, judgment must be suspended. Meanwhile, despite the enormous amount of work done in the past three years attempting to find the cause of these growths, it remains that for the cancerous diseases there is no cure and no palliation save narcotic sleep to the end.

Cholera.—Ferran, a pupil of Pasteur, in 1884 showed that guinea pigs could be made immune to cholera by the injection of gradually increasing doses of bouillon

containing cholera germs. He did not follow up this work in a scientific manner but immediately began injecting men. Large numbers submitted to his inoculations. In Spain 25,000 were injected in one year. He even advocated that wells should be infected with the germs, so that those drinking the water should be gradually immunized to the disease. He did not use pure cultures but grew them from feces of cholera patients. This was shortly after Pasteur's notable discoveries on vaccines. Ferran saw that the serum of men who had recovered from cholera had immunizing properties and he used this in treating other individuals. He had discovered the underlying principles in our present methods of serum-therapy. He made the fatal mistake of keeping his methods secret. Ferran's methods were dangerous, his results uncertain and his professional attitude deplorable.

Haffkine. another of Pasteur's pupils, in India, has continued this work of vaccinating against cholera, injecting 40,000 men last year.

Lazarus was the first to demonstrate that the serum of men who had recently recovered from this disease, would confer an immunity on guinea pigs, against the intra-peritoneal injection of cholera germs. Since that time many investigators have busied themselves with the problem of immunity and cure in this disease. There is at present a wordy discussion in progress as to whom belongs the priority for some of the principal discoveries. Pfeiffer of the Koch school in Berlin claims to have discovered a new ground for immunity. He finds it easy to immunize animals so that their serum can be used to protect other animals against the disease. But the interesting and important part of this work is the light thrown on the nature of these anti-bodies contained in the immunized serum. Pfeiffer finds that these anti-bodies have a specific action. For example, when a mixed culture containing the cholera germ along with various other species is subjected to this serum, the cholera germs alone are destroyed. Even when the mixture consists of morphologically related germs, the vibrios, the germs of cholera alone are attacked. He believes that in this we will have an entirely reliable proof of the presence of this germ that can be applied in diagnosis.

This serum can in the test tube destroy a certain number of germs and a far greater number in the body. By heating the serum to 60 degrees its ability to destroy germs in the test tube is taken away; but when injected into the body it still exerts its immunizing power and destroys the germs. His explanation for these facts is, that there is a sort of specific enzyme having two stages, an inactive and an active one. He compares these with glycogen and glucose. The serum does not contain the active substance, but a precursor of it. When this serum is injected into an animal the enzyme-like body becomes active, capable of destroying large number of germs. He finds that this immunized serum has no antitoxic action but is strong'y germicidal. As to the chemic position of this body his results are negative. He thinks that he proves that it is not an albumin, as it resists peptic and pancreatic digestion; that it is not a nuclein, that it is not a peptone, albumose or salt, for when freed as far as possible from these substances, it still exerts its specific action.

Here we have a direct experimental proof of artificial immunity due to a germicidal action, not to an antitoxin, and we are probably justified in concluding that in natural immunity the same principle is true. The body protects itself by an ability to destroy the introduced germs. Pfeiffer does not think that the serum treatment will be of much value in well developed cases of cholera. We are getting nearer and nearer to an understanding of how the body defends itself from the attacks of disease germs. And when once we understand this, the hope is justified that we can lend assistance when there is need.

Anti-streptococcic Serum.—Puerperal fever, erysipelas and certain of the septicemias are due to streptococci. This class of germs often attacks the weakened tissues and modify and complicate such diseases as scarlet fever, measles, diphtheria, tuberculosis and broncho-pneumonia.

As soon as it became certain that serum treatment as practiced in diphtheria and tetanus was successful, a number of observers turned their attention to the diseases caused or complicated by the streptococci. It was easy to see that a serum that would successfully check the attacks of these germs would have a wide range of usefulness, far greater, indeed, than that for diphtheria.

To obtain an antitoxic serum was the problem. But there were difficulties in the way. At the outset, here are several varieties, possibly species of the germs. Suppose we obtain a serum antitoxic to the germ found in erysipelas. Will it have any effect on the germ found in puerperal fever? I may say that it has been shown that the serum of an animal made immune by the injection of the germs or toxin obtained from any one of these diseases, is antitoxic to the whole group of streptococci. So far as we know, one serum can be used against this whole class of diseases and complications. Another difficulty: The streptococci did not take kindly to our artificial nutrient media. We would isolate the germs from a case of erysipelas, for example. In the first culture we would have a moderate growth; in the next it would be feeble, and after a short time it would die out altogether. Even in our most recent cultures neither the germs nor their toxins were very virulent. For example, it required something like 15 c.c. of a bouillon culture of the germs to kill a half-grown rabbit. After a careful study of the question Marmorek was able to increase the virulence of the cultures in an almost incredible manner. He claims to have finally obtained cultures, by growing in a mixture of human blood serum and beef bouillon and alternately passing through animals, so virulent that one one-hundredth billion of a c.c. was fatal to rabbits. With these cultures he immunized his animals.

This serum has been extensively used in the hospitals of Paris in treating the streptococcus diseases. Puerperal fever has, fortunately, become so infrequent that it will require some time before sufficient experiments can be made to show the value of the serum. The most striking results obtained with the serum are reported for scarlet fever. While we are wholly ignorant of the organism causing scarlet fever, we are quite sure that many of the complications of the disease, the throat, ear, kidney and heart lesions are, in part at least, due to streptococci. The Paris clinicians report very favorable results from the treatment. Baginsky in Berlin reports on the treatment of fifty-seven cases with the serum supplied by Marmorek and Roux. He says that, owing to the small supply of the serum, he was not able to give in

most of his cases the dose recommended by Marmorek. The death rate was 14.6 per cent., while the average death rate from 1890 to 1895 in this hospital was 24.9 per cent. He believes that but little importance is to be attached to these figures, owing to the great variation in the mortality in this disease, and concludes, that he is unable to draw any conclusion from his experiments, except that the disease was no worse for the treatment and that he intends to continue its trial.

In measles, as in scarlet fever, we believe that the complications are for the most part due to streptococcus infection, and the serum should be equally efficacious here.

It seems to me, although I have seen no suggestions for such application, that the greatest field for usefulness for an anti-streptococcus serum would be in tuberculosis. For some years the belief has been growing that pure, uncomplicated, non-septic tuberculosis is relatively a mild, curable and often self-limited disease. It is the complications that kill in tuberculosis. Most of us will agree that when there is any benefit from the administration of creosote and its allies, it is due to the action on the septic processes and not on the disease itself. And not a few hold that the chief, though not the whole benefit of mountain climates, is the aseptic atmosphere. Most of you are probably familiar with the work published by Prudden last year, where he conclusively showed that for rabbits, at least, cavity formation in tuberculosis was almost entirely due to secondary streptococcus infection. Now, if with this serum we can hold in check the septic processes we will have half conquered the disease. Although the work with this serum is still in the experimental stage, the outlook is very promising.

Anti-tubercle Serum.—Maragliano, Boinet, Picq, Babes, Maffucci, Paquin and others have reported work in this line. Most of them claim good clinical results. But tuberculous patients under any treatment, and without any, often improve and occasionally get well. So that, whether with justice or not, the claims of these investigators have met with but little approval. In experimental animals the best results I have seen reported are a prolongation of life in guinea pigs from an average, for untreated animals of some fifty days, to ninety in the treated ones. No treatment yet devised, be it serum or anything else, can save a guinea pig when inoculated with tuberculosis. And while our experimental animals are far more susceptible to the inoculated disease than man, the profession at large will be slow to trust any remedy that can not give demonstrable results in animal experiments.

Anti-pneumonic Serum.—The work of the Klemperer brothers on the immunization of rabbits against pneumonia has been followed up by Emmerich and Fowitzky, Redner, and Foa and Carbone. It has been possible to immunize a rabbit so that it would withstand more than three hundred thousand times the fatal dose of the germs for an untreated animal. With serum taken from such highly immunized animals it is possible to save inoculated rabbits if the serum is given five hours or earlier after the infection. In rabbits pneumonia is often fatal in twenty-four hours. The duration of the immunity produced in rabbits is long. After three months they resist fatal doses of the germs. So far as I know, the successful immunization of larger animals capable of producing serum in quantities sufficient for the treatment of the disease in man has not yet been reported.

Anti-rabic Serum.—Following the general lines of procedure in this field, the Italian bacteriologists have produced a serum for the treatment of hydrophobia. Their experimental work seems to be convincing. They claim many advantages for this serum over the Pasteur method of vaccines. The claims are that results are more certain and the dangers of treatment lessened, and of even more importance, the serum keeps well and can be used anywhere by any practitioner.

Anti-venom.—Drs. Calamette of Paris and Fraser of Edinburgh seem to have succeeded in producing a very satisfactory serum for antagonizing snake poison. That animals could be immunized to these poisons was shown years ago by Dr. Sewell in Michigan University. It seems that the serum produced from the venom of any one of the serpents is antagonistic to the poison of the whole group.

Typhoid.—In general the statements I have made in regard to cholera are true for typhoid. Animals have been immunized and a protective action can be demonstrated, but clinically the results are not convincing. Here, as in cholera, a germicidal instead of antitoxic action is shown. But where in cholera there is a specific action against one germ, it seems that in typhoid the serum antagonizes all related germs, as the coli group. This is as we find it in the streptococci.

Syphilis.—It is well known that one attack of this disease confers an almost perfect immunity against subsequent infection. Attempts have been made to borrow this resisting power. The serum of persons who have recovered from the disease has been injected into those who have been recently infected. Again syphilitic nodules have been macerated and this material injected into animals and their serum in turn used for the treatment of the disease. Good results are claimed from the serum of animals that have been treated for some time with mercury and iodids.

Smallpox.—Practically the same experiments have been tried with smallpox, the serum of immune individuals being used. Again, the serum from vaccine heifers that have become refractory to the inoculation has been used in treatment. Thus far the results of this treatment in these two diseases have not been noteworthy.

Possibly the best thing I have to report in the line of serum-therapy is the continued growth of the belief that disease can be conquered; that knowing the cause and the methods of many disease processes, we can and will find preventative or curative measures.

THE USE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA AND MEMBRANOUS CROUP.

WITH A COLLECTIVE REPORT OF ONE HUNDRED AND THIRTY-TWO CASES.

Read before the Indiana State Medical Society, May 29, 1896.

BY E. L. LARKINS, M.D.

TERRE HAUTE, IND.

During the year 1894, there were reported to the Board of Health at Terre Haute, Ind., 233 cases diagnosed as *diphtheria*. Of this number 102 were males and 131 females. There were 39 deaths recorded as

due to the disease. During the same period, 19 cases were reported to the Secretary of the County Board of Health, in the county outside of the city, of which number 9 were males and 10 females, with 6 deaths, making a total number of cases reported for the county 252, and the total number of deaths 45.

During the year 1895, there were reported for the city 182 cases, of which number 79 were males and 103 females, with 23 deaths. For the same period in the county outside of the city, 11 cases of which 7 were males and 4 females, with 6 deaths, making the total number for the county of 193 cases and 29 deaths. From Sept. 1, 1894 to April 1, 1895, there were reported 197 cases, of which 92 were males and 105 females. Of this number, 20 were fatal—9 males and 11 females.

From Sept. 1, 1896, to April 1, 1896, there were reported 150 cases, of which 62 were males and 88 females. In this period there were 21 deaths—12 males and 9 females.

Prior to Sept. 1, 1895, antitoxin had not been used except in a few cases. Since that time, it has been used by a majority of physicians in Terre Haute, and with a view of ascertaining as nearly as possible, the exact number of cases treated with it, with results, etc., I sent out a chart and find the total number to be 132, with 18 deaths, or 13.6 per cent., a summary of which is as follows:

SHOWING THE USE OF ANTITOXIN IN DIPHTHERIA AND MEMBRANOUS CROUP.

Number of cases reported, 132. Males, 61; females, 71.

Times used: 98 cases, one time; 25 cases, two times; 3 cases, three times; 4 cases, four times; 2 cases, six times.

Day of disease used: 21 cases, first day; 41 cases, second day; 24 cases, third day; 22 cases, fourth day; 8 cases, fifth day; 4 cases, sixth day; 10 cases, seventh day; 1 case, eighth day; 1 case, thirteenth day.

Age of each: 1 case 2 months, 1 case 5 months, 1 case 8 months, 1 case 10 months, 1 case 11 months, 7 cases 2 years, 16 cases 3 years, 13 cases 4 years, 18 cases 5 years, 14 cases 6 years, 13 cases 7 years, 16 cases 8 years, 3 cases 9 years, 10 cases 10 years, 3 cases 11 years, 3 cases 12 years, 1 case 14 years, 1 case 15 years, 2 cases 17 years, 1 case 27 years, 1 case 35 years, 1 case 50 years.

Number of cases of membranous croup, 8; times used in each case, from one to six; result, six recoveries and two deaths.

Number of immunizing injections given, twenty; result, immunity in all. In nearly every case no effort was made at isolation. No unfavorable symptoms reported.

Original location of disease and extension to other parts: Fauces in almost all cases, and tonsils principally; extension to larynx, 29 cases, 5 deaths; intubation 7 times, 3 deaths; extension to nares, 18 cases, 8 deaths; tracheotomy not reported.

Disease extended after injection in only one case, and in that the physician said he was not certain how long the child had been sick before he was called.

Death did not occur in any case where injection was used within the first forty-eight hours of the disease.

Did not notice any unfavorable effect of the injection.

Number of deaths, 18; within the first 24 hours in 14 cases, in 2 days in 2 cases, in 2 and 8 weeks in 2 cases.

Days of disease: 1 case 3 days, 4 cases 4 days, 6 cases 5 days, 3 cases 7 days, 1 case 8 days, 1 case 9 days.

Number of cases followed by sequelæ, 9; otorrhea in 1, nasopharyngeal paralysis in 6, aphonia and paralysis of right side of face and neck in 1, and paralysis of all voluntary muscles except of the head in 1. Recovery in all.

Thus we have the following table for the years:

	No. of Cases.	No. of Deaths.	Mortality Per cent.
1894	252	45	17.8
1895	193	29	15
Sept. 1, 1894 to April 1, 1895	197	20	10.1
Sept. 1, 1895 to April 1, 1896	150	21	14

Number treated with antitoxin from Sept. 1, 1895 to April 1, 1896—males 61, females 71; total 132, number of deaths 18, mortality, 13.6 per cent.

In the majority of cases only one injection was given to each patient, but in several it was repeated two or three times, and in two laryngeal cases six injections were administered, the cases being desperate and one eventually recovering.

It would appear from recent experience and a study of the literature upon the subject, that some of the deaths herein reported might possibly have been avoided had the remedy been vigorously pushed to its full therapeutic effect. It is the opinion of all observers that the earlier in an attack of diphtheria antitoxin is used, the better the results and consequently the greater the chances of recovery, and in an analysis of this collection of cases the statement is abundantly verified. In the 132 cases only one death is reported where the remedy was used within the first forty-eight hours of the disease, and in this case, there is doubt about the length of time the child had been sick before the physician was called. One physician reports a series of fifteen and another ten cases without a death, three of the latter being laryngeal, and with nearly all, the remedy was used on the first day, in four or five on the second day and in only three on the third day. In one case it is reported used on the thirteenth day, but upon inquiry the physician states the child had tonsillar diphtheria, from which it apparently recovered, but it subsequently extended to the larynx, for which latter involvement antitoxin was used with favorable results.

According to the reports read, the death rate increases *pari passu* with the length of time the disease had run before the remedy was used. In the 17 of the above 132 cases in which I used antitoxin, the result was favorable, except in two of the three cases where it was administered on the fourth day of the disease. These two proved fatal on the fifth day in twelve and eighteen hours after the injection, from sepsis consequent upon extension of the disease to the nares and laryngeal obstruction from extension to the larynx. I advised the use of antitoxin when I first saw the children on the second day of the disease, but the parents objected. I am still of the opinion that the children would have recovered had the antitoxin been used when I first saw them. On the fourth day of the disease when it became apparent that the children were sinking, request was made to have the antitoxin administered, but it was then my opinion, concurred in by the consulting physician that nothing would avail, as the little sufferers were beyond hope of recovery. In this collection of cases, the ages ranged from two months to seventeen years, but the great majority were from three to eight years of age.

Membranous croup is here classed separately from diphtheria, on account of the uncertain relation of the two diseases. There were eight cases of croup reported with two deaths, neither tracheotomy nor intubation being performed in any of them. These were reported as idiopathic or true croup—croup commencing in the larynx, in contradistinction to secondary croup, or diphtheritic laryngitis, due to extension of the diphtheritic process from the fauces. Of the latter class, twenty cases are given, with five deaths. In two of these the nasal and post-nasal cavities were extensively involved also, and it is difficult to determine which contributed most to a fatal termination—sepsis or laryngeal obstruction. In the

above twenty cases, intubation was performed seven times, with three deaths. No case of tracheotomy was reported.

In eighteen cases, the disease extended to the nares, eight of which died. The time of death in reference to the injection, was within the succeeding twenty-four hours in all but four. Two of these are given as the second day and two in two and eight weeks respectively. The last two cases were evidently due to some secondary effect of the disease.

The time of death in reference to the day of disease (except in the last two cases above mentioned) is given from the fourth to the eighth day. This taken in connection with the time in which death occurred after using the injection, clearly shows that the remedy was not used until after systemic infection had taken place, or laryngeal obstruction had so prostrated the system that the therapeutic effort of the antitoxin could not be obtained. Then, too, the remedy may not have been used as vigorously as it should have been.

There were reported twenty cases in which immunizing injections were given with no development of the disease and no unfavorable symptoms were observed to follow. In only two of the 132 cases is the disease reported to have spread after the injection was used. In one case of diphtheria, the nervous symptoms in a choreic patient, aged 12, appeared aggravated during the next 24 hours and then improved. In this series, six had post-diphtheritic paralysis; one had otorrhea. In one ease the paralysis effected the lower limbs and in another case the whole voluntary muscular system, except the head. Aphonia and paralysis of the muscles of the right side of head and neck in one. All recovered.

I will only give the history of a few illustrative cases:

On the morning of Nov. 8, 1895, I was called to see Frank M., age 7 years, and found him recovering from a severe convulsion. The history obtained, was that of some error of diet on the previous day and he had had a light chill a few hours before the spasm. As convulsions were easily provoked in the child there seemed to be no special reason for alarm, but his general condition lead me to suspect some grave disease. Pulse was 110, feeble; temperature 101 degrees, and he had vomited once during the morning. The throat was not examined on account of his general nervous condition.

I prescribed calomel, quinin and bromids, hot mustard foot-bath and hot cloths to the head and over the stomach. In about an hour and a half, I was hurriedly sent for, as the child had another convulsion. I increased the bromids and ordered a general hot pack in blankets. He soon recovered from the spasm and had no more during his sickness. I advised isolation, as I thought it might be diphtheria. Calomel $\frac{1}{4}$ gr. every hour; quinin $2\frac{1}{2}$ grs. every three hours and bromids as necessary, were given during the afternoon and night, followed by castor oil the next morning.

November 9, 9 A.M., temperature 100.5, pulse 112, complains of nausea and weakness. Examination of the throat shows the whole fauces deeply congested, tonsils swollen and a gray deposit on each about the size of a split pea. Diagnosis of diphtheria was made. Quinin was continued, mercury bichlorid one-sixteenth gr. in elix. pepsin and bismuth every two hours and teaspoonful of whisky every two hours, were given. Local applications of Loeffler's solution were made every four hours, and spray of peroxid of hydrogen 50 per cent. with saturated solution potassium chlorid every two hours; 4 P.M., the membrane has covered both tonsils and the uvula, and the child has had nasal hemorrhage.

November 10, 9 A.M., temperature 100, pulse 115. Throat emits a very fetid odor and there is a thin acrid nasal discharge. The whole fauces is completely covered by a thick leathery grayish-white membrane. The membrane is visible in the anterior nares and the child has a coarse croupy cough. I explained to the parents the serious and probably fatal condition and advised that antitoxin be immediately given. The mother dissented. The child's condition continued to grow worse and by the morning of 11th laryngeal obstruction was added to the faucial and nasal involvement. A more serious condition could not be depicted. They now consented to the use of antitoxin and I gave the child a full dose of the Behring No. 2. Now I would give the No. 3, and repeat in six or eight hours, in such a case. The laryngeal obstruction continued to grow worse during the day. In about six hours after giving the injection the child seemed much worse, but rallied some toward evening. About 8:30 P.M. I was sent for hurriedly, as the child was thought to be dying. A severe attack of dyspnea came on and the mother laid him on the lounge, thinking he was dead. When I arrived, he had rallied and was breathing better and improvement was continuous and rapid. I considered the sudden increase of dyspnea the night before, to be due to loosening of large portions of membrane thus producing complete obstruction of the larynx. I now omitted the mercury and gave small and frequently repeated doses of tincture chlorid of iron.

During the whole sickness effort was made to keep the nose and throat clear of septic matter, by the use of syringe and spray. The appetite was irregular and proper feeding was attended with difficulty. Aphonia remained several weeks after recovery.

I have given at length the history of this case in order to show by comparison the probable effect of antitoxin. About two weeks after my last visit to this patient, I was called to see two other children in the same family, one aged 5 years, and one 11 months.

The course of the disease was exactly the same, with the exception of the initial convulsion. I advised the immediate use of antitoxin, but the mother strenuously objected. I could not then conceive, that with such practical demonstration of the efficacy of the remedy in the other child, why objection should be made to its use in these two.

The children continued to grow rapidly worse until the afternoon of the fourth day of the disease, and all hope of recovery was abandoned, when request was made to have the antitoxin administered. My opinion, concurred in by the consulting physician, was that nothing would do any good, as the children were dying. Behring No. 2 was given, but both died in twelve and eighteen hours respectively.

It may be said that if antitoxin saved the first, it should have saved the other two. The inference is not justified, as the latter were profoundly septic, in addition to having laryngeal obstruction. The argument in this is, not that it saved one, but if used not later than the second day it would probably have saved all of them. Subsequent experience in the use of the remedy confirms my belief in this statement.

I will relate one other case of diphtheria, in a girl aged 8 years, who had enlarged tonsils and almost complete nasal obstruction from adenoid growths in the post-nasal cavities. The initial chill, followed by vomiting, occurred in the evening, and I was called the next morning. I found a typical case of diphtheria, the membrane covering the tonsils and extending up the edges of the palate. The characteristic acrid nasal discharge was present, showing extension to that cavity. The breath had a very fetid odor and her general condition showed profound infection. A full dose of Behring No 3 was immediately given, and a No. 2 given the next morning. We could do little with sprays and washes and no effort was made at local application. She immedintely began to improve and the recovery was uneventful. I attribute her recovery entirely to the antitoxin.

A marked feature in this case was the very great reduction in size of the tonsils after recovery. An older brother of this girl had diphtheria in November, 1895, to whom two injections of Behring No. 2 were given, and his general health has been better since than ever before. Previous to this sickness, he was subject to frequent attacks of sick-headache, but now seems entirely free from them.

The effect, apparently, of antitoxin in the case of a delicate, nervous girl, 5 years of age, to whom two injections of Behring No. 2 were given, and in whom choreic movements had been frequently noticed and nystagmus was almost constantly present when the child was excited, was that since recovery both have disappeared, and she appears perfectly well.

Diarrhea did not follow the use of antitoxin in my cases, but constipation was of such frequent occurrence that I suspect some causative relation.

In the treatment of membranous croup with antitoxin, I have only one case to relate. I was called in November, 1895, to see a girl aged 5 years. I informed the mother of the serious illness of the child, prescribed the usual remedies and advised that antitoxin be used. Consent was given. Next morning I injected a full dose of Behring No 3. By this time the disease was fully developed. In twelve hours another dose of Behring No. 2 was given. Next morning the child was better. There was considerable dyspnea for two days, but the child recovered without further treatment, except some simple remedies.

In all the cases, except two, in which I used antitoxin, I called another physician to see the case, that it might not be said I used it where no diphtheria existed.

Reliance was placed in all cases upon the clinical picture of the disease for diagnosis. This is partly in accord with the recommendations of the boards of health of New York, St. Louis, Chicago and other cities, as they advise the use of antitoxin in suspicious cases, and especially in those where the physician is satisfied diphtheria exists, and not wait for a bacteriologic examination, as that can be made later. It is in the early use of antitoxin that its specific effect can be obtained.

The Klebs–Löffler bacillus develops upon the false membrane, and in most instances accompanies the local manifestations of the disease. The streptococcus, said to be the most virulent of the supposed pathogenic microörganisms, develops beneath the membrane, is a late product of diseased action, and is found in cases termed mixed infection. They are found (as the Klebs–Löffler bacillus) in the throats of healthy persons, and even in the substance of the tonsils.

As to medical treatment of these cases, it has been claimed that it in no wise interfered with the use of antitoxin. I believe that large doses of bichlorid of mercury, in some degree at least, counteracts the effect of the antitoxin. Lately, I have confined myself to the use of small and frequently repeated doses of tincture chlorid of iron, and the moderate use of quinin and whisky. The free use of warm salt water or listerin properly diluted, for the purpose of keeping the parts clean, appears to answer every purpose.

This paper deals principally with an analysis of the reported cases.

Antitoxin in the treatment of diphtheria being of comparatively recent introduction, personal experience of the general practitioner must necessarily be limited in its use, and in many instances no opportunity has been afforded to observe its effects. It is from the experience of others that we must learn, and through collective investigation knowledge may be acquired by comparison.

The 132 cases herein given were reported by twenty-five physicians. The report is confined to Vigo County and principally to the city of Terre Haute. It will be observed that more deaths occurred in 1895 than in 1894, presumably on account of the greater severity of the disease. The report represents only the rate per cent. of deaths to the number reported and not to the actual number of cases, as physicians there seldom report more than one case in a family.

No subject could be of more profound interest to the physician, than that of the cure of diphtheria. In using the word *cure*, I refer to its literal meaning and practical application. No discovery since the days of Jenner, when he listened to the story of the milkmaid, and placed the practical banishment of that dreadful scourge, smallpox, within the power of all civilized nations, has been of such great value to mankind.

In antitoxin, I believe we have a true specific for diphtheria. In theory, and probably in fact, it is based upon the principle of vaccination, viz, *to render the human body immune to a virulent disease by introducing artificially into the system, a protective product developed through modification of its specific agent in foreign media.* After successful vaccination, a person may have varioloid, and thereafter, as a rule, be immune to the contagion of smallpox. The immunity conferred by the antidiphtheritic serum in the healthy subject appears to be practically evanescent, but what subsequent effect in this line, a curative dose of antitoxin has upon the human body suffering from a fully developed diphtheria case, has not been observed. So far as I am aware, a second attack of diphtheria has not been recorded as occurring in a patient cured of the first attack by antitoxin. It is well known that one attack of diphtheria confers immunity for a time, and it may be that the introduction of antitoxin into the system in the developed stage of the disease, may so fortify the protective elements that the body will not again become susceptible to the contagion.

The length of time in which antitoxin has been used is not sufficient for extended observation in this direction, but a second attack would be worthy of record.

The exact manner in which antitoxin cures diphtheria, is not definitely settled. According to the law

of Behring, material is developed in the blood which neutralizes the effects of the specific poison of the disease, and confers immunity to those in whom the serum of such blood is artificially introduced. The studies of Pfeiffer have, however, led him to the conclusion that substances are formed which destroy the infectious material and therefore eradicate the cause of the disease. It may be that cell action is so stimulated and the metabolic processes so changed that effectual resistance is offered, through the medium of the blood serum, to the further invasion by the infectious material. This is probable, as experimenters have found that the supposed pathogenic microörganisms may be cultivated in the blood serum of animals immunized for the disease which they produce. Moreover, antitoxins are held in solution in the blood, but do not pass through the coats of the vessels.

SERUM THERAPY IN DIPHTHERIA.

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5-8, 1896.

BY EDWIN ROSENTHAL, M.D.
PHILADELPHIA, PA.

Since the introduction of the diphtheria antitoxin as a specific remedy in diphtheria, I have used it in 127 cases of diphtheria with a record of five deaths.

As the character of my cases were in many instances of the most dangerous variety, and in nineteen instances necessitated the operation of intubation, I may not be misjudged if I ascribe to the specific action of antitoxin the results obtained.

To briefly summarize my work they are: Tonsillar 67; pharyngeal and tonsillar 14; nasal, pharyngeal and tonsillar 1; pharyngeal 1; laryngeal 12; tonsillar and laryngeal 18; pharyngeal, tonsillar and laryngeal 8; nasal, pharyngeal, tonsillar and laryngeal 4; pharyngeal and laryngeal 2; total 127; number of deaths 5.

The ages were: Under 1 year 4 cases; between 1 and 5 years 55 cases; between 5 and 10 years 30 cases; between 10 and 20 years 13 cases; between 20 and 40 years 25 cases. Nearly 50 per cent. occurred below the age of 5 years and about 25 per cent. between the ages of 5 and 10 years.

1. The deaths occurred below the age of 8 years and were as follows: Age 1 year, 7 months; variety, laryngeal and tonsillar; operation, intubation; time of injection, about seventy-two hours after injection; time of death, forty-nine hours after injection and intubation; cause of death, sepsis.

2. Age, 2 years, 2 months; variety, laryngeal, tonsils, nasal, pharynx; operation, intubation; time of injection, about the fifth day; time of death, thirty-three hours after injection and intubation; cause of death, sepsis and nephritis.

3. Age, 1 year; variety, tonsils, nose, pharynx, lymphatics; time of injection about the fifth day; time of death, three days after injection; cause of death heart failure—a septic case.

4. Age, 8 years; variety, tonsils, nose, pharynx and larynx; time of injection, about the fifth day; time of death, nine days after injection; cause of death, heart failure.

5. Age, 1 year 1 month; variety, tonsils, nose, pharynx and larynx; time of injection, fourth day; time of death, five days after injection; cause of death, heart failure.

They were as regards sex, 51 males, 76 females.

The time in which injections were made: first day, 21 cases; second day, 52 cases; third day, 34 cases with one death; fourth day, 8 cases with one death; fifth day 6 cases with three deaths; sixth day, 3 cases; seventh day, 1 case; eleventh day, 1 case; seventeenth day, 1 case.

Many cases were immunized, using for that purpose antitoxin from several laboratories. In those cases immunized no visual traces of the disease were seen, although the bacteriologic examination frequently revealed the Löffler bacilli. In one case treated for diphtheria of the faucial variety (case 87) a re-infection took place on exposure six months afterward (case 123) the disease manifesting itself in the same way. This proves, that while antitoxin has curative and immunizing virtue, it does not confer lasting or permanent immunity; but the susceptibility to infection remains as in any other form of treatment.

The complications noted: Broncho-pneumonia five cases, only seen by me in the laryngeal variety. Nephritis one case. Albumin was found frequently both before and after injection, antitoxin not increasing the amount. Sepsis four cases. Eruptions noted in about fifteen cases, and was also noticed in several cases that received an immunizing dose.

Sequelæ: Undoubted paralysis of the lower extremities in a female suffering from diphtheria of the laryngeal variety with membranes on the tonsils, complicated broncho-pneumonia, intubated, the tube being worn twelve days, and who received 1,000 units of Behring's antitoxin. The age of this child was 1 year 10 months; the injection was made on the third day, and there was perfect recovery months afterward. Heart failure in two cases, after disappearance of the membranes; in one case three days after the visits ceased. Ozena was noticed in one case.

Method of using the diphtheria antitoxic serum: Antitoxin should be chosen of undoubted reliability. I am pursuaded that my results are mainly due, not only to my method, but to the purity and efficacy of the antitoxin used The technique pursued in the one case is that pursued in all.

Antitoxin is graded as regards strength into what is termed by its originators antitoxic normals or immunity units, which is an amount of antitoxic serum required to save a 500 gramme guinea pig from a minimum fatal dose of the diphtheritic toxin. The number of immunity units per c.cm. gives a standard strength of the serum; for instance: one one-hundredth c.cm. will protect a 500 gramme guinea pig, therefore 1 c.cm. of antitoxic serum, which protects 50,000 grammes of guinea pig, contains 100 immunity units, and would protect an individual weighing one hundred times as much as a guinea pig (about one hundred and twenty pounds, if the susceptibility were the same. The serum, of which 1 c.cm. equals 100 immunity units, is that with which most of my work was done. Serum of greater strength was used. Knowing the strength of the serum makes me have no regard for the quantity used, as I grade my dosage in immunity units and so apply it.

The technique. The antitoxin serum is used as a curative or immunizing agent by subcutaneous injection into the tissues of the body. For the purpose of making these injections any hypodermic syringe may be used if of sufficient capacity, as the Pravaes syringe, the Koch bulb syringe; I prefer a special antitoxin syringe, made for this purpose, having a capacity

of 10 c.cm., and which can be measured accurately by a screw, so that the quantity used can be administered in one injection. This syringe is supplied in metal case, with vulcanized rubber packing, thus permitting complete sterilization of both syringe and case. I have discarded asbestos packings since they become soft and pulpy.

The parts chosen by myself are in the back between the scapulæ on either side of the vertebral column. Other parts of the body, as the loins, groins or sides of the chest have been selected.

The parts are thoroughly cleansed by means of alcohol soaked upon sublimate cotton or gauze, and after injection are hermetically sealed with iodoform collodion.

The syringe is cleansed by means of very hot water and the whole operation rendered as aseptic as possible. I have yet to record an abscess, or even any inflammatory reaction following at the seat of injection, all of which I ascribe to the rigid cleanliness enforced, in the use of my needles as well as in the parts acted upon.

The dosage. The amount of antitoxin used depends upon the time of making the injection, the age and body weight of the individual, and the gravity of the disease, also whether for the purpose of immunization or cure.

Experience has taught me that the method arrived at by the originators of the antitoxin as to the quantity of serum necessary to antagonize the toxins of diphtheria was the correct one; I therefore follow the original method and grade my dose into immunity units.

As an immunizing dose I give an injection of 100 units to perfectly healthy individuals exposed to the contagion—their body weight averaging 120 pounds, basing the dose on these being of equal susceptibility to the guinea pig. This dosage is now the general rule. If there be constant exposure I increase this dosage to 200 units. By constant exposure I mean where the individual to be protected lives in the same room or house, as the tenement system of any large city. In extraordinary instances, as a woman in the last days of pregnancy, about to be confined, I inject a full dose, 600 units, as an immunizing dose. Of such cases I have seen two instances with the most satisfactory results; the accouchement taking place in one instance in the very room occupied by the still affected child, and no symptoms being manifest.

As a curative dose. If the case be seen early, within twenty-four to forty-eight hours, and is of the faucial variety, where the infection has not reached the lymphatics, I administer at once 600 units. If the case be seen on the third day, or if at the very beginning the infection is such that leads one to believe in the necessity of prompt heroic treatment, as in the laryngeal cases or where the lymphatics are involved, or where the bacteriologic examinations show mixed infections (streptococcus, staphylococcus, etc.), I immediately inject 1,000 units. I then await results. If in six to twelve hours no change takes place or the symptoms are aggravated, I again inject 1,000 or 1,500 units of the serum, and so on in increasing quantities until there be an amelioration of the symptoms shown by a decline in the pulse rate and temperature and an improvement in the general condition.

The quantity of antitoxin can be increased to enormous dosage; being harmless, no danger can be apprehended. I have used as high as 13,000 units in one case. Others have used 200 c.cm.—20,000 units, with complete recovery.

Clinical manifestation of the diphtheria antitoxin serum.

1. The effects on the pulse and circulation. In faucial diphtheria, within a very short period, about eight hours in the most favorable cases, the pulse rate declines and remains down and the circulation assumes the normal. This, however, may not be permanent, and if the rate increases again it is an indication for the administration of more antitoxin. Especially is this an indication in those cases where the toxemia is so marked that the temperature is only slightly above the normal or is subnormal. In laryngeal cases, however, the pulse rate remains high in the majority of cases, and this is seen especially in those cases intubated. The indication then is not so much for the antitoxin as for judicious collateral medication.

2. Effects on the temperature. In the most favorable cases, by which I mean the pure and simple diphtheria, there is a rapid decline from any elevation of temperature to the normal, and this decline is permanent. Where, however, there may be a recurrence of the fever and no manifestation of any intercurrent complication as pneumonia, and the like, it is an indication for an additional administration of the antitoxin, even if the occurrence should take place in one, two or three days after the injection. An elevation of the temperature later than four days indicates a broncho-pneumonia or some other disease and should be treated accordingly. In laryngeal cases is this especially marked, and in those cases intubated it has been seen by myself even after the tube was withdrawn.

3. Action on the diphtheritic membrane. The action of the antitoxin is visible to the naked eye by the effects on the diphtheritic membrane.

It limits the extension within twenty-four hours and promotes the separation in forty-eight to seventy-two hours.

As an indication for the sufficient use of the serum I have noticed a distinct red line surrounding the membrane, making a line of demarkation between the healthy and diseased mucous membrane. Over this line I have never seen the membrane spread, and when it has formed my experience has taught me to expect a very favorable prognosis in that especial case.

The membranes separate differently; in some cases it comes away in one piece, leaving a healthy mucous membrane beneath. In other cases, especially those in which there is mixed infection the membranes soften and become pultaceous, and seem to dissolve or melt away.

4. Effects in laryngeal diphtheria. When used early enough it prevents the spread of the membranes, thereby averting asphyxia, and avoids the operation of intubation or tracheotomy. The membranes disappear in the same manner as in the faucial variety, stenosis being invariably relieved on the third day. Where the laryngeal diphtheria is complicated with membranes on the tonsils, pharynx or nose, these disappear at the same time as the stenosis.

Intubated cases. Of the forty-four cases of laryngeal diphtheria, sixteen cases necessitated the operation of intubation, three of which were within the twenty-four hours after injection; the others were intubated before or at the time of the injection.

The average reduction in the time the tube was

worn was sixty-nine hours. Previous to the serum period the average time was 185.25; since this period the average time was 116.25 hours. This reduction was noticed and soon recorded by Huebner (*Klinische Studien*, etc.), Von Ranke, Johan Bokai, O'Dwyer and others.

Inasmuch as the indication for tracheotomy was the length of time the tube was worn, with the concurrent symptoms, decubitus, etc., the time being placed above 120 hours. No urgent symptoms were manifested even in the long cases to necessitate tracheotomy. For that reason antitoxin has proven itself of the utmost value and is one of the conspicuous evidences of its effects.

Antitoxin has reduced the mortality in cases of intubation. In my cases so treated the reduction has been from a mortality of 62 per cent. before the serum period, to 10.5 per cent with antitoxin. Nor do I stand alone in this experience. Bokai (Stephanie, Kinder hospital, Buda-Pesth) reports in his hospital work an increase of 17 per cent. in his cures. The reduction in the time the tube was worn in those cases of recovery was eighteen hours, the average being sixty-one hours serum period, against seventy-nine hours before the serum period.

Jos. O'Dwyer of New York, whose work on this especial method of treatment is so well known to you all, has very kindly sent me a short report of his cases, a transcription of which I give here:

"My results up to the present time in 500 cases, in a series of hundreds: First hundred—largely experimental—seventeen recoveries; second hundred, twenty-seven recoveries: third hundred, thirty recoveries; fourth hundred, twenty-six recoveries; fifth hundred, thirty-nine recoveries.

"The marked increase in the last series was due to the antitoxin, in thirty cases, of which there were twenty recoveries. In the seventy preceding cases in which no antitoxin was used, there were only nineteen recoveries, which was about the same percentage as in all the other series."

O'Dwyer's statistics substantiate my own; from a mortality ranging from 83 to 70 per cent. before the serum period his reduction has been to 30 per cent. The average time the tube was worn, serum period, was 80 hours; before this period the time was 147 hours. So the reduction in time in O'Dwyer's cases was 67 hours.

Its action on the duration of the disease. Antitoxin limits the duration of the disease to four or five days and shortens the period, which may reach to weeks.

When administered early in simple diphtheria all visual traces of the disease disappear on the third day.

In mixed contagion the diphtheria infection is antagonized and the complications treated without regard to the existence of diphtheria.

In the laryngeal variety the stenosis disappears the third day in those cases not requiring operative interference. In cases intubated, the tube can be withdrawn with a certainty and exactness on the fourth or fifth day, such a rule being unknown before the serum period.

The general condition of the patient in the majority of cases improves at once, and by its early use, even before depression was manifested; thereby preventing complications and sequelæ, the termination of which, even with the antitoxin treatment can not be averted.

As a prevention of the meddlesome and dangerous method of constant local and systemic treatment in vogue. As antitoxin acts specifically and the general condition of the patients improve so quickly, no necessity arises for the constant and persistent methods of applying local applications formerly pursued.

It is true that the membranes of the throat are the foci for the invasion of the system by the diphtheria toxin; it is equally true that the injection of the antitoxin antagonizes and prevents further infection. If this be so, and thousands of cases have clinically demonstrated it, the persistent endeavors to remove the membrane by hourly or half-hourly applications are not only superfluous but dangerous, as not only tending to keep the patient awake and in dread, but by weakening the recuperative powers open a way for complications and a dangerous or perhaps fatal sequelæ (paralysis, heart failure and the like).

For this reason when treating a patient with antitoxin, local applications may be made once in four to six hours, and simply for the purpose of cleanliness, or for the specific purpose of ridding the throat of the bacteria, thus preventing the danger of contagion to others.

Poisonous drugs, as corrosive sublimate and the like, are unnecessary, or if administered as indications might require (as ulcerations resulting from the diphtheria, etc., in long cases) may be given at longer intervals.

Nourishment and stimulants are required, but for shorter periods than before, two or three days, and dispensed with when no longer indicated.

While antitoxin is a specific for diphtheria, it is not a "cure all," and complications must receive thorough attention as if diphtheria no longer existed. If the circulation be weak and the case urgent, stimulants, strychnin, digitalis, camphor or ammonia may be indicated. Again if a complication, as pneumonia or nephritis, exists this should be treated without any regard to the diphtheria or intubation, by the wet packs or any method most favored by the operator. But the constant applications to the throat and syringing of the nose at too frequent intervals is to be deplored as tending to a fatal result.

On the presence of bacilli in the throat. Antitoxin does not destroy the Klebs-Löffler bacilli in the throat. They persist as long after convalescence as under any other form of treatment.

It is therefore well to make frequent cultures before permitting the patient to mingle with others, thereby spreading the contagion.

I am at present studying what remedies are most useful in destroying these bacilli, and I have the hearty coöperation of Dr. B. Meade Bolton, the director of the bacteriologic laboratory in Philadelphia, who examines these cultures for me.

I have used calomel combined with salol; corrosive sublimate, Löffler's solutions and a solution of nascent chlorin with tincture of the chlorid of iron, which I have used for a long period. The Löffler solutions and the chlorin iron mixture have given me the best results.

The formulæ of the Löffler solutions are as follows:

No. 1.

Menthol	10 grms.
Toluol, q. s.	36 c.c.
Alcohol absol.	60 c.c.
Liq. ferri sesquichlor	4 c.c.

No. 2.

Menthol	10 grms.
Toluol, q. s.	36 c.c.
Creolin	2 c.c.
Alcohol absol.	65 c.c.

They are used by applying locally to the throat or nose by a mop or spray. Löffler's No. 1 is a painful application and is very much objected to for that reason, and can not be frequently used. The No. 2 is less painful and is applicable to a wider range of use.

The chlorin-iron mixture is administered in teaspoonful doses to a child 5 years of age once in two or three hours, during the day time only.

The formula is:

Potassii chloridi		
Ac. hydrochloric, C. P.	āā	1 00
Tinct. ferric chlor.		5 00
Syr. simplicis or glycerini		120 00

The bacilli disappeared under either of these medicaments in two weeks.

Guaiacol has been used by Dr. Martin W. Barr and Dr. Solomon Solis Cohen as a local application. The application is as painful as Löffler's, though Dr. Cohen has obviated this somewhat by the addition of menthol. Their results have been good, though systematic bacteriologic examinations have not demonstrated any superiority over my methods.

As an immunizing agent. That antitoxin produces immunity against an attack of diphtheria has been abundantly verified by a vast number of observers both in hospital experience and in private practice.

The quarantine system in vogue in Philadelphia has given me frequent opportunities to verify the assertion of Behring, Roux and others. This immunity is not lasting. Biggs of New York places it (from careful observation) at thirty days, Behring places it from six to eight weeks. I have seen no case immunized show clinical traces of the disease, though frequently Löffler's bacilli were found in the throat; where such cases existed, they were carefully watched and cultures made from time to time (once in three days). No other treatment except the immunizing dose was used, and cultures made and examined by Dr. B. Meade Bolton or Dr. H. D. Pease evinced the the presence of the bacilli even to three weeks, though no visual traces were ever seen.

Antitoxin does not confer permanent or lasting immunity from diphtheria even to those who suffered from an attack of diphtheria and were treated with a curative quantity of the serum. For the susceptibility to a reinfection on exposure still remains with the patient, and therefore it should always be proper to immunize the patient whenever exposed.

The influence of antitoxin on the mortality records. There is no city in the world whose records have been carefully kept that has not shown a marked reduction in the death rates by the antitoxin treatment. I might except Philadelphia, which seems to be behindhand in the method of presenting her records as compared with other cities.

There is no hospital in the world where antitoxin has been used that has not shown a reduction in the death rate. Again I must note exception to this by the records of the Philadelphia Municipal Hospital, where it appears only hopeless or the most serious cases are sent, for this hospital holds the most unique position of recording an increased mortality from this method of treatment.

There is hardly an exception to be noted in the statistics of private practitioners, which also show a reduction in the death rate.

Still, despite these positive proofs of the utility of the serum treatment; there seems to be a passive antagonism by some to this form of treatment. I can only explain it in the words of Dr. Charles L. Dana, New York (Diphtheritic Palsies and the Use of Antitoxin, *Medical Record*, April 11, 1896), from whose excellent monograph I quote: "While the treatment of diphtheria by antitoxin is a method that has been approved in all parts of the world and is upheld by a volume of statistics whose brute force is almost overwhelming, yet there is still some degree of skepticism about its real value. Most of the skepticism is the result of profound and banal ignorance, coupled, perhaps, with some hysterical obsession in the lines of zoöphilism and antivivisection. There are, however, some conservative physicians whose character and attainments we respect, who still hold a position of reserve, if not of disbelief, as to the value of the method, and they advance some very ingenious explanations of the way in which the statistics that so apparently favor antitoxin are gotten up."

These statistics are supposed to contain in a majority of instances cases whose recognition is simply bacteriologic and where the clinical diagnosis is secondary. Even if this be so, and I for my part have not counted as cases treated those immunized in whom the specific bacilli were found. I think the statistics are superior to the former for this reason: Given a case of diphtheria as formerly treated prognosis was out of the question; a mild case might suddenly become a serious one. A laryngeal case may become tracheal. With antitoxin the disease is aborted and the serious lesions now so commonly noted by different observers as broncho-pneumonia, multiple neuritis, post-diphtheritic palsies, etc., were not noted before because the patients perished long before these complications were noted. Therefore, given a case as now treated with antitoxin, if the serum is used early enough and in a judicions manner, mortality records should be simply to prove exceptions to the rule, and the death rate noted show a lack of careful observance of the earliest symptoms of diphtheria.

AN INTRODUCTION TO THE DISCUSSION UPON "BLOOD-SERUM THERAPEUTICS."[1]

Read in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-seventh Annual Meeting of the American Medical Association at Atlanta, Georgia, May 5 8, 1896.

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Probably the most radical change in the ideas of the causation of disease that has ever occurred has taken place during the last thirty years, its final outcome being the subject of the discussion before this meeting to-day. The steps leading up to the position at present occupied have been taken only after many wanderings and painful experiences, but as a result we seem to have reached a rational standpoint from which further progress may be made. The basis of blood-serum therapeutics is the idea of *immunity*, and the procedure is the result of the investigations made to determine how immunity occurs. It had been known for a long time that after attacks of certain

[1] In the preparation of this paper I have received much assistance from the little work of Lachalme, "Blood-Serum Therapeutics, Paris, 1896."

diseases, there was a period during which a second attack of this same disease did not occur. This was, and is, known as *acquired immunity* to the disease in question. Certain races of animals are known to be immune to certain diseases, and this is a *natural immunity*, for which there must be some explanation if only it could be found. This explanation would give a basis for work directed toward the solving of the problem of how this immunity could be produced intentionally, and if this could only be done, we should have made a long step toward the actual and proper treatment of disease.

The securing of artificial immunity has been attempted in several ways; the best known and longest employed is that of vaccination. This method consists in the employment of the virus of a milder disease of the same type, thus, after the attack of the milder disease, and because of it, securing an immunity against the malignant form of disease. Since the introduction of bacteriologic methods, other means have been sought to attain the same end. The protective inoculations against rabies illustrate the use of the actual virus of the disease in an attenuated form, but of gradually increasing strength, to produce an immunity against the full strength of the same virus. Another method makes use of the living cultures of the bacteria producing the disease, as in the protective inoculations against anthrax, and still another of the products of the growth of the bacteria in the test tube, as in the employment of tuberculin. The theory of the action of these various methods is not the same, but their results, so far as they have been explained at all, have been supposed to rest upon some changes produced in the tissue cells or those of the blood, and it is to explain these results that much of the recent work has been carried on.

As to priority in the suggestion of the method under discussion, the position of the *British Medical Journal* seems to be a reasonable one: "The question of who was the originator of the serum treatment is one of interest. It is always difficult to speak with certainty on a point of priority of this kind, for new ideas seldom spring from one man, but we believe that the method had its origin from the observation made in 1887 by Von Fodor, that blood, when drawn from the body, had a distinct bactericidal action. Nuttall and others then pointed out that although this bactericidal action might be connected with the corpuscles of the blood, it was not confined to them, as the serum of freshly coagulated blood was found to contain some proteid substance which undoubtedly exerted a powerful bactericidal effect. In July, 1889, Babes and Lepp recorded a number of experiments in which they had found that the blood of dogs which had been vaccinated against rabies exerted a distinctly protective action when injected into susceptible animals either previous to or along with the virus procured from a rabid animal. Ferran appears to have been the next observer to accentuate this point. He was followed by Bouchard in France, whilst Behring and Kitasato in Germany, and then Roux in Paris, and others in rapid succession pointed out that there was in the serum of the blood of animals vaccinated against diphtheria and tetanus a distinct prophylactic and curative agent which, however, it was difficult to separate from the serum. In 1891 patients were treated in Berlin by the serum prepared by Behring," and the endeavors in this direction are more numerous and widespread to-day than in any other line of medical activity.

So far as the bactericidal properties of an immune body are concerned, all experiments tended to show that they lay especially in the blood, and the main portion of modern endeavor is in the study of the properties of this portion of the body.

The results put it beyond question that the serum of certain animals is so much opposed to some bacteria as not only to hinder their development but actually to destroy them. But this is very far from establishing a general rule as regards immunity, for the refractory condition of an animal and the bactericidal property of its blood are not by any means always, or even most often, present in proportional degree. As for example the bactericidal property of the rabbit's serum, an animal extremely receptive to anthrax, and the absence of bactericidal properties in a dog's blood, who is especially refractory himself to anthrax. So that while the bactericidal property of the serum is a very important matter, it can not be considered as being a factor in the production of immunity. Its existence, however, has served to show that the serum is not an inert material and has been the basis of other important investigations upon the properties of this tissue.

The attenuating power is one to which much attention has been paid by Bouchard, Roger and others, and is probably only a part of its preventive power. This latter factor seems to have been neglected by these observers, and it would seem that the mixtures of serum and bacteria they injected were harmless, not because the bacteria were attenuated but because the serum preserved the tissues from the pathogenic action of the bacteria which accompanied it. From the latest work on this question it appears that the bacteria increase their virulence in the blood of refractory animals, whether in the living body or in the test tube, and that this increase of virulence is the result of a new adaptation, or of a selection among the most resistant bacteria. So that even the existence of an *attenuating* power of the serum seems to be doubtful at present.

The possibility of the *antitoxic* action of the serum first suggested itself to Behring as an explanation of the constantly observed fact of the persistence and development of bacteria at the point of inoculation in refractory animals. The immunity in such cases could not be due to any effect upon the vitality of the bacteria, and the only explanation remaining was that of a neutralizing or destructive action upon their toxic products, this action being carried out by the blood-serum, in preference to the other tissues of the body. Taking up the study of diphtheria and tetanus, two diseases in which the results appeared to be especially due to the action of the products of the bacteria and not of the bacteria themselves, Behring and Kitasato showed that a mixture of the toxins of these bacteria with a small amount of the serum of immune animals could be injected without any results in animals extremely susceptible to the toxin alone. The results were found to be the same whether the mixture was made in the living animal after injection or in the test tube before injection; and also that the injection of the serum in another part of the body, and a little before or a little after that of the toxin could protect the animal from many times the fatal dose of the toxin so far that no effect would be produced by the latter. These observations were of the utmost importance and were asserted to destroy any ground for belief in the theory of phagocytosis. They

were and are believed by many to represent a direct chemical action of the antitoxin upon the toxin, which it either destroys entirely or turns into an harmless product. This antitoxic property is something wholly distinct from a bactericidal power, and is much less easily destroyed, for it resists a temperature of 65 degrees C., the addition of small percentages of antiseptics, and dilution of the serum with water. The antitoxic property has been ascribed to a definite substance contained in the serum, and this substance has been compared to a globulin or a diastase, without as yet ever having been separated, although many efforts to that end have been made. Whatever it may be, its power is enormous, as is shown by the experimental results obtained with serum containing it.

The idea of Behring and Kitasato, of the destruction of the toxin by the serum containing the antitoxin, although simple and easy of comprehension, does not appear to be applicable as a general theory, the more particularly if the observations of Metschnikoff and his followers be correct and taken into account. Metschnikoff has shown in his researches upon the blood of rabbits immunized against hog cholera, that their serum exercised a manifestly curative and preventive effect in fresh animals and without of itself possessing any attenuating or antitoxic property. In other words, that the effect was not merely due to a direct action upon the toxin or bacteria, but that a most important factor was the vitality of the tissues themselves in which the action took place. So that according to Metschnikoff, the action of the serum is especially a stimulation of the tissue resistance, exercised more particularly upon the phagocytes, making them better able to carry out their defensive action. The globucidal power of the serum is another factor that has to be reckoned with. It is closely allied to the bactericidal, and has been studied more especially by Buchner and Daremberg. It is shown upon introducing blood corpuscles of one animal into the serum of another. In such an experiment, the corpuscles are very rapidly disintegrated, and disappear in a very few moments.

This phenomenon occurs in the circulating blood or in the test tube, and Buchner especially has attempted to identify it with the bactericidal property of the blood-serum. They do in fact have characteristics in common, for they are both destroyed at a temperature of about 55 degrees C., upon exposure to light, or upon a modification of the saline constituents of the serum, but the existence of a special albuminoid substance, an alexin, as supposed by Buchner, is not by any means an accepted fact. The coagulating power of the serum is shown by its introduction by intravenous injection in another species of animal. Coagulation very quickly follows because of the precipitation of fibrin, but Richet and Hericourt demonstrated that this was to be avoided by making the injection in the cellular tissue, *not* directly into the blood vessels, so that the injected serum could only enter the blood current after passing through the lymphatics; and it has been recently shown by Hayem that this coagulating power is destroyed by raising to a temperature of 55 degrees C., while Mairot and Bosc found that only 52 degrees C. was necessary to accomplish the same purpose. The same authors have demonstrated the toxic properties of serum injected into animals of another species, as manifested by muscular pains, febrile disturbances, respiratory affections and even fatal convulsions. These properties are somewhat more resistant to heat than those already spoken of and are supposed to be due to certain albuminoid materials. They are extremely variable in different animals and in the same animal toward different species, and they also vary very much in accordance with the condition of health of the animal from which the serum comes. The existence of such properties as these in the serum is of the utmost importance, and that they may exist is unquestionable. At the same time it must be remembered that their effects are only markedly present in intravenous injection and that a wholly different picture is presented as the result of introduction into the subcutaneous cellular tissue. In this situation these toxic effects are so slight as to be inappreciable and may therefore be practically disregarded.

These powers of the serum are apparently closely allied to the physiological characteristics like the "glycolitic" of Lepine and others, and the "peptosaccharizing" of Lepine and Barral.

This paper being merely introductory, the foregoing portion has been devoted to a brief and incomplete summary of the present knowledge of the properties of the serum in general, so far as they are concerned with the present subject.

The production of the antitoxic power has been attempted in the effort to secure immunity or the cure of many diseases, and these efforts are carried out in the same general way. The steps include the production of a toxin immunity first and then an antitoxin immunity. The differences between the two conditions are, that the former is slow in coming, is dangerous during the process, but is lasting and complete when obtained. It is, however, wholly inapplicable to general use. The second is very easy to obtain, is very rapidly reached, is not dangerous, but is not lasting, and sometimes, owing to the uncertainty as to how far it is necessary to go, is not complete. The process of obtaining the first is by the injection into the selected animals of gradually increasing doses of the toxin, either filtered free of the bacteria, or else with them still present, these injections being kept up until they have reached such a point that the animal is not affected by a dose of the toxin or culture sufficiently large to be fatal to untreated controls. This animal has then reached the condition of toxin immunity, and this immunity is a very lasting one. The condition is due to the presence of the antitoxic principle in the blood-serum. This antitoxic property may be used to secure an antitoxic immunity in other animals, and these not necessarily of the same species, provided the serum containing it be injected subcutaneously.

These are the simple bases of the method, the details are of the most varying and, as yet, indefinite character. The remarkable thing is, not that we know so little in regard to these details, but that so much has been accomplished in the time over which the investigations have extended.

A simple list of the diseases in which it has been sought to apply these principles for the production of the antitoxin is a long one, without any attempt being made to give an account of the methods pursued in each. Such a list—and incomplete perhaps—would include the investigations of Richet and Hericourt upon their staphylococcus pyosepticus, and the work upon *anthrax*, *hog cholera*, *avian septicemia* and *symptomatic anthrax*. *Rabies*, *typhoid fever*, *pneu-*

monia and *tuberculosis* have also been studied, without great success so far as is generally known. In *diphtheria* certainly, probably in *cholera*, and possibly in *tetanus* are to be found the main results that justify us in hoping for further advances in this direction so far as the application to man is concerned. Very possibly, too, results that may be immediately forthcoming will show that we are much nearer to a solution of the problem of the streptococcus antitoxin than at present seems to me to be the case.

THE FALLACY OF ANTITOXIN TREATMENT AS A CURE FOR DIPHTHERIA.

Read in the Section on Diseases of Children, at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

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Early in my medical career, and at the time that Pasteur declared he had discovered a certain remedy for hydrophobia, it seemed a pity to me that the profound effort could not have been directed to the cure of diphtheria. Hydrophobia is such a rare disease, occurring not oftener than one to the million per annum, whereas diphtheria is universally prevalent, is the reason why regret was felt at the time of his publication. What it was hoped he might have done, is alleged to have been done by other investigators. Pasteur claimed in 1884, that a product made from the culture of the brain of an animal which had been inoculated with the disease of hydrophobia, was able, when injected beneath the skin of the human being, to cure rabies. This prophetic utterance emanated from a man who seemed to me, during this period of medical adolescence, to be utterly irrefutable. The scientific position which was accorded him, made his declaration appear to the world at that time, and to me with almost the same awe inspiring force, as if it had been an inspiration which had directed his mind and his hand. Hundreds and thousands of human beings have turned their faces toward the Pasteur Laboratory since 1884, supposing that they were mortally wounded by the teeth and the virus of mad dogs. There have been many who have presented themselves at his gate who were bitten, but not by a mad dog; hundreds of others who were bitten through the protecting folds of the clothing; many, indeed, who were simply licked by the tongue of a dog, not bitten at all. Still others have submitted to the inoculation through curiosity, having had no injury whatsoever. So great is the influence of the modern press that a scientific proposition, while still in the germinative state, is heralded throughout the civilized world, and is quickly transformed into a perfected science by writers of the press. There were a few who were able to doubt the truth of the allegation as to the curative influence of the Pasteur lymph. Long before cool and scientific inquiry could be made by physicians away from this center of discovery, the die had been cast that hydrophobia was curable by Pasteur lymph. At this present moment there are unmistakable proofs that error in judgment and in practice is the largest element in the hydrophobia cure. During the first few years of the experimental inoculations for rabies, many deaths occurred among the patients; so many, in fact, that Pasteur himself became alarmed at his own work. During a later period the death rate from hydrophobia, as stated at the Pasteur institute, became less. The lowered death rate was proclaimed to be the result of the natural improvement in the process, and at the time, was accepted by nearly all. In the last few years of the hydrophobia cure the death rate has been materially lessened and is attributed to still further advancement in the understanding of the treatment. Right here is where the point, which is to be drawn from the foregoing statements, appears.

Whatever may be the view of persons who have not personally investigated the treatment of hydrophobia by Pasteur lymph, the real explanation of the reduced mortality since the declaration of the treatment in 1884, is directly due to the dilution of the curative lymph. In so far as the reduction of the virility of the laboratory product is concerned, just so far has there been advancement in the progress; perhaps, if the lymph was indefinitely attenuated, the mortality would be still less. This recital is introduced to show the error which may exist in one of the greatest therapeutic faiths close to the end of the nineteenth century.

Bacteriologic investigators, in Berlin and Paris, sent word to the United States recently, that diphtheria is curable by a specific medicine. This specific cure is produced as follows: A culture of the germs of diphtheria is injected, day after day, in increasing doses for a long time, into a horse, until it is able to withstand the poison of 250 cubic centimeters of the diphtheria virus, whereas one-tenth of a cubic centimeter of the same virus would be fatal to a guinea pig. After a certain period has elapsed a quantity of blood is drawn from the jugular vein of the horse, and the serum, after being further treated in the laboratory, is ready to be injected beneath the skin as a cure for diphtheria.

Ever since the discovery by Tyndall that the atmosphere, as well as the soil and the water, is inhabited by life in invisible form, there has been a prolific series of theories concerning germ organisms. It is generally accepted that a constant state of antagonism exists between minute organic life, and it is supposed that preservation as well as destruction of life, is attributable to these germs which are warring with each other. First came the discovery of germ life in nature, followed in due time by the declaration that all diseases are due to the influence of pathogenic germs. The next step consisted of a conception that pathogenic germs must be antagonized by other germs in the preservation of life and the treatment of disease. The next step in the process is that pathogenic germs, or their ptomaines, are able to be counteracted in their influence upon the life of the human body, by either the same germ or its own ptomaine. It is believed that during the period of inoculation of a horse with the diphtheria culture, a process is going on which is generating a fluid in the animal, that is antagonistic to the disease which it is assumed is caused by the original germ, namely, diphtheria.

Let us now consider diphtheria from a clinical standpoint. There are two varieties of diphtheria which exist to-day, but, one of which did not exist yesterday. One is true clinical diphtheria, the gross symptoms of which are entirely sufficient for practical diagnosis. The other form is the diphtheria of the bacteriologic laboratory. One is diagnosticated by the clinician, while the other is discovered by the bacteriologist. These two varieties are made necessary by reason of the claims of bacteriology, by which

discoveries practical medicine has been both aided and retarded. Aided, by helping to a clearer understanding of the pathogenic and bacteriologic changes during the process of disease, and hindered, for the time being, by throwing a cloud across the pathway of natural and practical therapeutics.

Diphtheria is a systemic disease with both general and local manifestations. The local manifestations are located principally in the throat and larynx. By some observers the local symptomatology is considered paramount. It is taught by bacteriology that local microbes develop toxins upon the mucous membrane of the throat, and from this source the entire system is infected, whereas the true explanation regards the pathologic changes in the throat as but local exhibitions of general systemic poisoning. The laboratory declaration that a Klebs–Löffler bacillus found in the secretions of the throat establishes *prima facie* evidence that a disease is diphtheria, need not confuse our judgment and interfere with the conclusion previously stated in the foregoing sentence. It is undoubtedly true, that suitable nourishment for the growth of germs is found in the throats of children whose general system is impaired with diphtheritic sepsis. The so-called specific germ is found upon the tonsil both in health as well as in disease. Is it, therefore, a reliable means of determining the diagnosis of diphtheria?

Is the explanation of the false membrane which forms upon the throat, thus interfering with respiration, to be found by bacteriologic inquiry? When the system is impaired, and a determination of the weakened vital forces results in an inflammation of the fauces, there is thrown out upon the mucous membrane a thick, tenacious, glairy fluid, which dries and thickens into a membrane. The inflammatory state of the mucous membrane keeps adding fresh serous discharges, thus augmenting the deposit and ultimately filling the free space of the throat. In this serum the colonies of a variety of germs find normal food for nourishment and growth. Owing to the occlusion of the breathing space, insufficient air enters the lungs and further embarrassment of the health of the child quickly ensues. Examinations of the blood show an altered relationship among the component parts. Capillary circulation is diminished and congestions arise, both in the structures of the throat and neck, and in other tissues which are adjacent. The physical economy of the vital organs is imperiled and their functions are imperfectly performed. Retention of morbid matter rapidly accumulates throughout the entire system, especially in the capillary and lymphatic vessels. Great efforts are made by the resisting vitality to unload its burden and repair the damage.

At this time of the pathologic processes there are two therapeutic measures which are imperatively demanded: first, the supply of new force to the tissues by fresh nutrition; and secondly, aid to the impaired efforts of the organism to remove the morbid and retained matters. Nature is doing all that it can to carry the effete material produced by the disease, out of the system through the excretory organs. At this moment what is accomplished by forcing into the circulation a substance which has no natural relationship to the structure of a single element composing the entire body? The system is laboring and panting for life, under the oppression of toxins which it is trying to eliminate. At the very crisis of the greatest strain upon vital resources, a serum which does not belong in the human economy, is strangely added to the fearful load, which is in some cases the last straw that breaks the camel's back. Its use is therefore unphysiologic and absolutely contraindicated. The bacteriologist affirms to the contrary; observe which is the better able to judge, practical clinicians or the ultra-scientist in the laboratory?

The claims that are seductively held out that cases treated early by antitoxin would recover have utterly failed. The claim subsequently that cases treated by antitoxin recover more quickly than those not so treated has utterly failed to be true. The claim that the death rate would be lessened has proved to be a disappointment. The claim that antitoxin was harmless has been proven to the contrary by many fatal terminations. Judging from the facts concerning the use of antitoxin in practice, does there stand on record to-day one single valid reason, from a clinical standpoint, to encourage the hope of better results in the future than have been attained in the past by other methods of treatment? It is not the purpose to impute insincerity, or lack of intelligent industry, on the part of the profession, concerned in experimenting with antitoxin, but the promises of better results through its use have unfortunately failed to be substantiated.

The human system, when laboring under morbid influences, needs rather those elements which can add strength and vigor to the vital resistance. By what law or principle in physiology can augmented vital resistance be maintained by the introduction of antitoxin into the system? Has the explanation of the action of antitoxin been satisfactorily given by those who are its sponsors? It is to be conceded that there are cases of diphtheria which, when treated by antitoxin, have seemingly progressed favorably, while there are other cases which have quickly terminated fatally. The influence of the antitoxin virus is directly dependent upon the condition of the patient at the time of its introduction. If the powers are well maintained, as during the first few days of the disease, naturally the system is stronger and its efforts more effective toward elimination, both of the antitoxin introduced and of the autogenerated toxin. Here is the explanation of the advantage claimed by the early use of antitoxin. It follows, when the system is further impaired its phagocytic action is also impaired, and the chances for recovery by reason of the further introduction of extraneous matter are lessened. What physiologic problem could be more simple? The point is this, that the blood does not need to be further polluted in order to expel the autogenerated products which it already contains. Can any one explain the reaction which takes place in the human living organism when antitoxin is added? There is a reaction, but that the reaction is a curative influence is open to discussion.

A small amount of morbid matter adjacent to living cell structures is dissolved away by the leucocytes and forced out of the body through the escapes provided by nature. This takes place regularly when the cell is aided by forces which contribute to its vigor. If the vitality is diminished by extensive morbid processes, extraneous matter added to the sys- only further weakens the reconstructive agencies which are at work. The theory that sepsis of any kind, already in the system, is able to be neutralized by the addition of manufactured toxins from without, though freely taught, is utterly inconsistent and

unreasonable. Can the chemic reactions of the laboratory be successfuly repeated in the laboratory of the human body?

Has horse serum, plus disease, any natural place in the human blood? And the red corpuscles are dissolved by its presence. No material success has ever been achieved by the transfusion of healthy animal blood into the human body for the cure of disease. Transfusion of salt water accomplishes all that is claimed for the process. Now then, how much the less is likely to be accomplished when an infected animal serum is injected for the cure of diphtheria?

The blood has lost some of its component elementary conditions. It is thereby altered in character, and when acting through inflamed mucous membranes morbid symptoms are produced, such as are seen in diphtheria. The fluid which patrols the entire body should be strengthened rather than further decomposed and disorganized by the addition of extraneous and poisonous matter.

The records of the cases treated in the Willard Parker Hospital of New York City prove that antitoxin is dangerous and even fatal. The statistics of that hospital establish that the further use of antitoxin is unjustifiable. Extreme interest and effort to know the truth has guided the staff of the Willard Parker Hospital. Dr. Joseph E. Winters of New York has sought diligently to establish the value of antitoxin, but the clinical experiences have forced him unwillingly to condemn its use. Is it safe to neglect the warning of such an experienced clinician and medical teacher? Professor Lennox Browne of London, patiently and earnestly sought for clinical reasons to further the interests of antitoxin. His conclusions are emphatic and pronounced against it. Dr. Weeks of Philadelphia also deprecates the use of antitoxin, basing the conclusions upon an extensive experience in the Municipal Hospital of that city.

Health department statistics of New York are cited in Chicago to the advantage of antitoxin, and Chicago statistics are published in the interest of antitoxin in New York. Health department methods of collecting information must be taken with allowance for accuracy. Previous to leaving Chicago a culture was made of the tongue of the office boy and the tube left at the city health office. The answer received stated that the case was one of true diphtheria. In fact, the boy was not ill at all. Provisions were immediately made by the department to fumigate and otherwise annoy the family at the boy's home. Is it not easy to be seen that the enthusiasm and overzealous interest of the medical corps in the employ of cities may bring to the notice of the health departments cases similar to the one cited? Such reports go on the records and contribute toward the statistics which are sent broadcast. The statistics very quickly become confused and their power for usefulness is absolutely *nil*. Unquestionably large numbers of cases which have been reported to be diphtheria and cured by an injection of antitoxin have been of the bacteriologic class.

It was recently stated to me, upon good authority, that the sales were falling off rapidly and an early termination of the demand for antitoxin was not for off; also that offers to purchase antitoxin upon most advantageous figures had been declined because of the fear of pecuniary loss. Thus the straws point the way the wind blows.

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SOME PRACTICAL POINTS ON THE COMBINED EFECTS OF ANTITOXIN AND INTUBATION,

WITH SPECIAL REFERENCE TO INFANT FEEDING IN MALIGNANT DIPHTHERIA.

Read in the Section on Diseases of Children at the Forty-seventh Annual Meeting of the American Medical Association at Atlanta, Ga., May 5-8, 1896.

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Certain factors appeal to us in a severe case of laryngeal diphtheria. The main point to be considered, however, is to afford instantaneous mechanical relief and prevent asphyxia. This, to my mind, is of more importance than the consideration of what the real therapeutics shall be.

If therefore, a child has recovered from the exhaustion following this mechanical relief by intubation, then it is necessary to commence with the real therapeutic management of the case.

If a history of diphtheria exists, and we are positive of the diagnosis, then we should without delay inject our case with either 5 c.cm. of antitoxin of the strength of 500 normal units, and if no relief is afforded in twenty-four hours, then we repeat the injection of the same dose of antitoxin. The choice as to the location of the injection depends on the practitioner. My own preference has been, that seen by me in Berlin with Professor Baginsky, in the interscapular space. It is not the purpose of this paper to detail the technique of intubation, for every one of us, no doubt, knows when and how to place a tube.

The same might be said for the injections of antitoxin. They have become so universally used that the technique is very well understood. It is an important point to lay stress on what I consider of vital importance, especially so, when we hear of sudden deaths occurring within a minute or two after an injection of antitoxin has been given. Any one familiar with the danger of injecting air into a vein will at once recognize the great importance of selecting that part of the body which is least likely to have large veins, and where we would be least apt to puncture them. A thrombus forming in a vein can easily produce death, and we all know that were the barrel of the syringe filled with plain water or milk or with any other ingredient, that death would occur just as quickly if air is injected into a vein, as it does or has done when antitoxin is injected.

We then have reached the two main indications demanded by science of to-day in the treatment of an obstinate case of laryngeal diphtheria: 1. We have satisfied nature's demand for the relief of the stenosis by intubation, and probably avoided asphyxia. 2. We have aimed, by injecting the antitoxin, at the destruction of septic elements or toxins introduced in the system through the agency of the Klebs-Löffler bacilli. The most important part of the treatment of a severe laryngeal diphtheria consists in the after treatment. I insist in every case of laryngeal diphtheria, with a tube in the throat, on feeding per rectum. By this means we can guard against that most dangerous complication, namely, Schluck-pneumonie. This latter is caused by the suction or flowing into the trachea, bronchi and capillaries of liquids, intended for swallowing, and causing pneumonia.

That such a pneumonia is not only a very difficult matter to handle, as a complication, should not be lost sight of, for more than one-half of all fatal cases die of this complication. I therefore advise giving a cleansing enema of soap and water, usually a pint in all, and throw it into the rectum and colon to wash away accumulated feces, and follow this cleansing enema by nutrient enema of peptonized milk, peptonized yolk of egg, peptonized beef juice, and sometimes small quantities of brandy if stimulation is called for. The interval of three hours is usually called for owing to the risk of exciting too active peristaltic movements and having the nutrition emptied out of the bowel.

It is well to bear in mind that the rectum absorbs and does not digest, and therefore that only liquid nourishment should be thrown in. No solid food should be pushed into the rectum. Small quantities will be better borne than large ones; all farinaceous food, like barley, rice and farina, soup made from beef, veal or chicken can be thrown into the rectum in quantities of one to two ounces.

I have frequently tried to resort to forced feeding by pushing a catheter through the nares into the esophagus and pouring small quantities of liquid food directly into the stomach, but this is such a highly objectionable plan in private practice that I have almost completely abandoned it. You will agree with me that while some parents will think it cruel to push a Nelaton catheter through the nose of their beloved infant for feeding purposes, they will not object in any way to using the rectum and colon for this purpose.

A point to remember in connection with dyspnea which sometimes occurs in an intubated child, is that relief is frequently afforded by giving inhalations of oxygen so that as a matter of routine, I invariably advise a cylinder of oxygen to be kept handy, in a malignant case of diphtheria with stenosis and threatened asphyxia.

The wonderful results achieved by me in the treatment of this dreadful disease are due to the rapidity with which I tried to overcome urgent symptoms. Thus I never leave a high temperature, of 105 degrees, without at once giving an antipyretic bath, immersing the child in a temperature of 90 and gradually cooling to 70, the duration of the bath to be in all about five minutes. This is to be continued every three hours until the temperature remains at 102. I do not use antipyretics during the course of treatment of diphtheria. One of the greatest mistakes encountered by physicians is that after an injection of antitoxin has been given, they discontinue all further medication. They do not properly nourish their patients and merely look for miraculous disappearance of the pseudo-membrane and all further symptoms after this one injection, and thus it is that the great many failures in the treatment of diphtheria with antitoxin are not due to the impotency of this most valuable therapeutic agent, but rather to the careless after-treatment, and sometimes the exhaustion of the patient, from lack of proper nourishment.

I insist on a thorough nasal irrigation of warm salt water solution at least twice a day, in every case of diphtheria without nasal complication, merely as a hygienic measure.

Sustain the Heart.—This can best be done with nourishment, and the less drugs used, excepting those urgently called for, as for example strychnin in minute doses, the better. A wise plan is to give most children as little alcohol as possible. It is a good plan to give all medication hypodermically, so, for example, a minute dose of strychnin can be used if required, or alcohol can be injected. A cool, clear temperature of 65 to 70 degrees will add much to the comfort of our patient. If the glands of the neck are very much swollen, then an ice collar will do a great deal toward relieving *the swelling*. Spartein is sometimes called for, but unusual care must be exercised owing to the irritability of the stomach. Pseudo-membrane should be carefully noted in regard to its size, and every diminution looked upon as favorable progress. *Fetor ex ore* is a usual symptom of necrotic tissue, be it in the form of a pseudo-membrane or otherwise, and is usually found during the course of laryngeal diphtheria. A gradual fall of the temperature, not by crisis, but by lysis, should be looked forward to as a favorable symptom; so also the diminution of the size of the glands of the neck.

Such symptoms as high-colored urine with small traces of albumin, possibly a cast, were now and then found during the ordinary course of a malignant case of diphtheria, long before antitoxin was discovered. It is therefore not surprising to find it now.

I look upon the disappearance of a high color and a freer secretion of urine, and a disappearance of the albumin as favorable symptoms indicating convalescence. The respiration in some of my cases reached as high as one hundred per minute. A diminution in the number of respirations and at the same time decrease in the rapidity of the pulse, with the fall of temperature by lysis, are all favorable symptoms.

Diaphoresis, when commencing after a few days of treatment of a malignant case of diphtheria, I look upon as very favorable symptom, being nature's effort of eliminating toxic elements through the sweat glands.

I have purposely refrained from tiring you with the description of clinical histories of single cases of diphtheria, and furthermore, do not care to give you statistics which can be made to suit the whims of any author, but can assure you that I recognize to-day in diphtheria, not the old foe of former times, but am willing to give a better prognosis to-day, with proper antitoxin treatment, aided by so called supporting treatment, which consists in concentrating nutrition when the body most needs it, than by any old fangled method of treatment known.

AN EXPERIENCE WITH ANTITOXIN WITH INSTRUCTIVE RESULTS.

Read in the Section on Diseases of Children, at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5–8, 1896.

BY JOSEPH WM. STICKLER, M.S., M.D.

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I will quote but two cases, types of others, to call attention to points which seem to me to be of importance in connection with the administration of antitoxin.

Case 1.—Some time ago I was asked by Dr. Simmons of Orange, N. J., to see a boy about 7 years of age, who was suffering from some form of laryngeal stenosis. At the time he requested me to consult with him he could not discover by the ordinary method of examining the throat (with tongue depressor) any membrane. When I arrived at the house the child was sitting upon his mother's lap, presenting the appearance of a child in the advanced stage of so-called membranous croup,

i.e., laryngeal diphtheria. The breathing was however fairly easy, at times losing its marked stridulous character. When the respirations were not markedly quickened and labored the skin was normal in appearance and the lips ruddy in color. The pulse was full, strong and regular. Mind clear, urine normal, and body well nourished. An examination with the laryngoscope revealed the presence of quite a large amount of membrane within the larynx. This discovery when coupled with the previous history of the case led me to give a very unfavorable prognosis. I told the Doctor I would be ready to perform tracheotomy any moment he might desire it, fully expecting to be sent for before the following morning. During the interim I advised the use of antitoxin. Three days passed before I heard of the boy's condition. Imagine my surprise when Dr. Simmons told me that the patient began to improve almost immediately after the use of the serum and made a complete recovery in one week. The points presented by this case are: 1. The laryngeal stenosis had been gradually increasing up to the time I saw the patient. 2. The stenosis was due to the presence of membrane which was demonstrable by the use of the laryngoscope. 3. The vital powers of the child had not been markedly depressed by the toxins of the Löffler bacilli, and it is to this latter point I wish to direct special thought.

Case 2.—Dr. Thomas S. Fitch of Orange, N. J., asked me to see a little girl 5 years of age who had diphtheria. The disease had developed three days prior to my first consultation. When I was admitted to the sick room the child was breathing at the rate of thirty to thirty-five times per minute, and the respirations were very labored in character. The pulse was weak and averaged 100. The pupils were somewhat dilated, and the child was very irritable. The skin was mottled and of an ashy hue. The lips were red but somewhat shriveled. The hands trembled and the gait was unsteady. When left alone she would sleep, turning occasionally from one side of the bed to the other. The urine was diminished in quantity and was slightly albuminous. The body was fairly well nourished, but only small quantities of fluid nourishment could be given at comparatively long intervals. The entire pharynx, tonsils, soft palate and a portion of the hard palate presented to view a dense membrane broken only at a few points. The nostrils also contained membrane. Bacteriologic examination showed the presence of myriads of the Klebs-Löffler bacilli. Dr. Fitch felt inclined to use antitoxin. My opinion was that because of the tremendous depression of the vital forces the child must die. It seemed best therefore to support the heart's action, if possible, till nature could rally her spent powers, and to accomplish this result we decided to use active heart stimulants and such nutriment as the patient could and would take. In addition to this line of treatment we thought we would try antitoxin, giving 10 c. c. at twelve-hour intervals. The patient got steadily worse until about twenty-four hours later, when she died. The point presented by this case, which seems to me to be of great moment, is this, the folly of using antitoxin when the whole animal economy has been struck such a tremendous blow by the poison of the diphtheria bacilli.

Judging from these and other cases, I believe that when the heart's action is fairly good, when the system at large has not been seriously impaired in its tone, when the urine shows little or no albumin and indicates no organic nephritic trouble, as in the first case quoted, I care not how much membrane there may be present, antitoxin when judiciously used is likely to benefit the patient. When, on the other hand, conditions obtain such as are mentioned in Case 2, I believe antitoxin to be contraindicated.

DISCUSSION ON PAPERS OF DRS. ELMER LEE, JOS. M. STICKLER AND LOUIS FISCHER.

Prof. Edwin Klebs, Citronelle, Ala.—First permit me to speak on the papers read before us. Dr. Elmer Lee stands on the old standpoint of the pathology of diphtheria, which is not tenable. We must, it seems, accept the bacilli as the only cause of diphtheria. That is necessary not only from a bacteriologic or a laboratory view, but of a clinical view also. You know that in diphtheria we first see an affection of the throat, a slight angina, and later a general affection; that is the consequence of the action of the diphtheria bacillus in the throat. The few cases in which we have no local affection are not contrary to this opinion. The local affection may occur in parts we can not see in the larynx or be a very slight one. But we need not dwell on this point longer. Now the second point he has brought forth, the observation of the diphtheria bacillus in the throat of some healthy people. That part is often discussed. But it seems to me quite clear that the right explanation of it is not given by Dr. Lee.

We see so often in grave diphtheritic epidemics, that the children become sick in a grave manner immediately after having caught cold. In this manner I have lost a child. He was out in a heavy snow storm in Zurich, and upon returning had diphtheria. How was this to be explained? Surely the child had the diphtheria organisms present before, and under the influences of the cold there was made some change in the mucous membranes, probably an obstruction of the circulation that we can see microscopically in fresh cases, so that the tissues become better adapted for the growing of the diphtheria bacilli. And then, if the gentleman does not accept that the diphtheria bacillus is the cause of diphtheria, we would have two different diseases in the same body and we must ask, What is that other disease not differing from the diphtheria bacillus? Now, the other preferred opinions are very difficult to speak upon. He has said the antitoxin can be dangerous. I asked him and he said, yes, he had personally seen such cases. But we will return to that point later.

Dr. Stickler has brought forward two cases, one doing excellently, in such manner as, if I have understood it right, one can not think otherwise than that there has been a very beneficent influence of the antitoxin. In the second he had no effects. But, have we any one treatment that will be efficient in all cases? That is not possible. But I think Dr. Stickler has given us a very important paper. Clear observations are often more valuable than greater statistics.

Now as to the last paper. I have not understood much of it, but I believe the gentleman had good results with the antitoxin. I can not enter into details and return to a more general discussion. From some we hear that the antitoxin serum is inefficacious and may be sometimes dangerous; from others we hear that it seems totally reliable. Now, we must have fair play in this matter. It is enough to now state that numerous observers had good results in a great number of cases. That in farther progressed cases there is noted inefficiency, can not be a ground for rejecting the treatment; a graver objection is the possibility of sudden death after the injection of the antitoxin.

The first point we must regard in this question is the experimental foundation of the whole question. It seems to me there can be no doubt that an anti-poisonous or antitoxic effect of these substances is fairly demonstrated. If Behring and others inject great quantities of it at the same time as poisonous matter from diphtheria cultures, into the abdominal cavity of guinea pigs, and the animal will not die while control animals die in a very short time, we can not say otherwise than that there is a benefiting antitoxic influence. The same observations have been made by all good observers. If we find such a degree of security in animal experiments we can not say there is nothing in it and it is not probable that the same substance is of no use in man, when it is effective in guinea pigs.

But there is another point to discuss. Behring and others have said the antitoxin has alone a healing influence, but it has also a preventive influence. That is another question. We must ask, Can we immunize with the antitoxic serum in a certain quantity susceptible animals? Some physicians have asserted that they have had good preventive results by injecting as small a dose as one cubic centimeter of serum into children. But, gentlemen, that must be a mistake. They may have injected the serum and the children have not become diphtheritic, but that does not prove that the injection prevented the diphtheria. It is very difficult to speak of such a preventive action without proof of infection. But we have other and better ground to say it can not be that there

is given by the injection of so small doses immunity to any animal or human being. The serum has proven a good nourishment substance in which it is possible to cultivate the diphtheria bacillus. Now, can the same substance, in such small quantity, immunize an animal if the diphtheria bacillus can grow upon it? We will remember how great quantities of the strongest diphtheria cultures are necessary for immunizing animals. These must be continued for a long time and the immunity lasts for only a short time. And so I think the antitoxin has not an immunizing power; or, at any rate, such power has not been demonstrated. I must say I have not been able to read the latest German papers, but I think conclusive experiments have not been made. Whether the assertion of R. Pfeiffer that his cholera serum effects degeneration of the cholera vibrio is acceptable or not we can leave undecided.

I think statistics are always a little uncertain. When a new remedy is used, many mild cases are healed in a short time. In Berlin there are two hospitals. The patients in the St. Urban Hospital were treated with the serum whereas in the Bethanien-Hospital the patients were not treated with the antitoxin. The death rate was reduced in the first from 50 to 20 per cent., in the second from 50 to 30 per cent. But in the first the cases were nearly doubled in number, so that more lighter or fresher cases were treated by antitoxin.

Now I come to a point that seems to me to be of the highest importance, the danger of antitoxin. I wish that point would be illustrated in a more extensive manner by publishing all cases in which the injection was shortly followed by death. We have such cases, but a part of them seems to be on account of the disease. But if in one case alone the patient has been killed by antitoxin, we have a great interest to find out the true cause of the death. Such a case is that of Professor Langerhans in Berlin. After a girl in the house became diphtheritic, he thought he would, if possible, prevent the spreading of the disease to his own children, but after the injection the first child died immediately. So it is possible that death may occur after the most cautious injection of antitoxin, a fact that gives a high responsibility to every physician using this remedy. We must search, therefore, to find out, what may have been the cause of such fatal accident.

In this case it is reported that the body of the dead child was quite normal, well nourished. There was no introduction of air into the blood. The danger of introducing air is, by the way, not so great as often accepted. One can inject some centimeters of air in the blood vessels of a rabbit without any bad effect, as the air is resorbed in a very short time. It will be better to inject the fluid in children into the muscles far distant from the lungs, in the dorsal or gluteal region. Then it is convenient to push the needle alone in first and see if bleeding follows or not. If not, one may inject without fear, but always slowly, under no high pressure. If these precautions are followed, I think that no danger can be feared from the injection.

If all these precautions were taken in the Langerhans case, I can not tell, but it is clear that, if the death occurred by the injection into a vein, the antitoxin used must have been in a high degree poisonous.

I do not know, if the consequences of such injections in the blood of animals are studied, or if kymographic designs for measuring the blood pressure and action of the heart before and after the injection of antitoxin are made, certainly they should have been, if they were not.

I think it is not probable that the antitoxic serum itself contains such a formidable heart poison, as very great quantities of it injected into the peritoneal cavity of animals proves harmless. Much more probable it seems to me, that in this and other similar cases observed in Brooklyn, N. Y., an accidental pollution of the antitoxin has combined with intravenous injection to produce the fatal effect.

The sure disinfection of serum is a very difficult matter. Twice I have found microbes in tubercle-serum. On the other side, the best antiseptics, as mercury-bichlorid, phenol and kresol make coagulations in the serum. Therefore, one must search for other disinfectants that will not coagulate albuminous matters. I note that chinosol is proclaimed as such by Emmerich; its antiseptic action is forty times stronger than carbolic acid and does not coagulate albumin. I have proved it a very good disinfectant for external and internal use, and I would recommend it for the disinfection of serum. Certainly we must demand from the manufacturers of antitoxic serum, that they must prepare the serum in an absolutely pure manner, excluding totally the possibility of accidental pollution. It is not a good manner to dispense it in colored bottles. It can be protected against the light by dark coverings.

I am sure that all these precautions can be executed and will be executed in this land, in which I have seen as good bacteriologic work as anywhere in Europe. I remember with pleasure that in many of our cities are instituted health offices for the preparing of the anti-diphtheritic serum (New York, Pittsburg), in which in every case of diphtheria the presence of the diphtheria-bacillus is controlled by bacteriologic examination and the serum is given gratuitously to the profession. In Berlin the magistrate has declined to do the same. I hope that the demands of science will always find here a ready reception.

DR. W. E. CASSELBERRY, Chicago—Having had considerable experience with antitoxin, especially in laryngeal diphtheria, I feel I may at least recite my experience. Previous to the introduction of antitoxin, the results in laryngeal diphtheria and membranous croup were very unsatisfactory. The published results, on the average, only saved about 25 per cent. of all cases that had come to the operating stage. The antitoxin has reversed my statistics, or at any rate my statistics have been reversed, to the saving of about 75 per cent. of cases. I attribute this to the antitoxin, in the first place, because the two epidemics were parallel, and secondly, because of the course of the clinical symptoms. The antitoxin in my hands has, both in laryngeal and pharyngeal diphtheria, within twenty-four hours after its administration, had the result of reducing the intumescence of the parts. I have not observed it caused a rapid falling off of the membrane, but the swelling and intumescence, which is responsible largely for the laryngeal obstruction, within twenty-four hours subsided. The other clinical symptoms also ameliorated under the influence of the remedy. The broncho-pneumonia does not so frequently supervene. The antitoxin appears to limit the disease and prevent its further extension. The tube having been introduced into the larynx, we have to dread much less the extension of the disease in the form of broncho-pneumonia and membranous bronchitis into the respiratory passages not within the reach of the tube. And I feel here the antitoxin has been a very decided help. I do not regard the antitoxin as an innoxious remedy. It has not been my custom to recommend it as a prophylactic measure. I endeavor to make the diagnosis as soon as possible. The microscopic tests I consider of value, but I do not rely wholly upon them. I think the experience of the clinician is of equal value with the bacteriologic examination, and if with that we can find the Löffler bacillus, I think the diagnosis may be made with certainty. But I like to have the clinical experience and the bacteriologic examination both to indicate diphtheria before the serum is used. I think we can conceive that the individual in health might be more affected by the antitoxin than are those affected with diphtheria. Inasmuch as cases have been reported of death following the use of the serum as a prophylactic measure, I think it is better to wait until a diagnosis of diphtheria is made.

DR. J. A. LARRABEE, Louisville, Ky.—In the discussion it seems the papers went back far enough to discuss the germs

themselves. There is no such thing as germ *theory* at the present time; it is germ *fact*. So to make progress we must not go back and stir up the germ theory.

It is said of all microörganisms, they are omnipresent, but it is only during the arousing and calling into activity of these germs we have disease. And all those things which put the germs into activity, are causes of disease.

It is surprising we should contemplate immunizing against a disease which does not immunize against itself. The comparison of antitoxin with Jennerian vaccination has fascinated the laity. In one we have a very complete protection continuing for life, ordinarily. This is a molecular change, which remains. It is not and may not be expected the antitoxin, when it fills our greatest expectation, will secure immunity. So, I have not in a single instance attempted immunization in practice. The theory has not appeared tenable to me. I have arrived at this point, there can be no question about toxins and antitoxins. There is no question, even in diphtheria, but that antitoxins, if properly prepared and if they are the real antitoxins, are potent to arrest the disease in its progress. I have seen four children die who I believe would not have died if they had not used antitoxin. I have seen twelve cases of laryngeal stenosis get well, that would have died without the antitoxin.

It is an accepted law, that remedies are capable of doing harm in the abscence of disease. It is untenable to suppose sufficient air was injected to produce death. When the jugulars are injected with sufficient air, death may supervene. It is probable a curdling ferment has been introduced, which upon the return of the circulation, in two or three minutes, has produced a thrombus. But I believe the antitoxin does produce an immediate effect on the kidneys. In one poor little fellow, apparently doing well, death occurred within twenty-four hours with complete anuria. Anuria is almost pathognomonic in diphtheria, but this was not the time for it to appear in the case I have mentioned.

Another important point is with reference to pure serum. All who have used antitoxin much have observed the diphtheria rashes. These indicate the heterogenous products formed. I have found the greatest care necessary in color inspection of these bottles before using, and I stopped one just in time, perhaps, to prevent an accident. The fluid was turbid and milky.

We know these cases without intubation died and with intubation we formerly relieved only 25 per cent. of cases. Since the introduction of antitoxin, I have had less fear of laryngeal stenosis, and four cases have gotten well without intubation. I do not believe we can get such good results from anything else. I do not think we should abandon the other treatment. We should take all due pains to remove septic material from the throat. Since I have done this in scarlet fever, I have had less ear trouble and other complications. I believe most of the cases of sepsis have an origin in the throat and not outside of it, and many cases usually supposed to die from diphtheria really die from sepsis. I hoped somebody would bring out the value of the knee-jerk in diphtheria. It is considered by some of my friends in the Windy City as diagnostic of diphtheria.

Now in regard to this treatment, it does not inhibit or prohibit the old well known fortification of the blood. Whatever may be introduced in the form of animal toxins, the invasion of the blood is the principal danger. So I shall not give up the old-fashioned muriated tincture of iron, given internally and applied externally.

Dr. W. B. Parks, Atlanta—The city of Atlanta has just sent in its first order for antitoxin. The only cases we have had here have been cases of follicular tonsillitis, and hence we have not secured the antitoxin sooner.

Dr. Rosenthal, New York—As to the changes in the blood, due to the injections of the antitoxin, the latest paper was published April 25, by a gentleman from New York, and was a report made to Professor Biggs, of New York. He had three series of cases: one of pure diphtheria; another, in which the antitoxin was used, and the third, in which the results were given before and after the antitoxin. After the introduction of the antitoxin there was no change in the red blood corpuscles or in the leucocytes. As a curative dose in diphtheria, I have used as high as 13,000 antitoxin units; others have used 20,000 units of the antitoxin, and these patients are walking the streets to-day, well. I have never seen any bad complications following the injections. I give the injections between the scapulæ. I prepare the back by washing with corrosive sublimate. I have in my room a chart, which my student and an assistant have made, in which they have taken hourly the temperature and respiration of the patient, and made chemic and microscopic examinations of the urine nearly hourly, and they have found no increase of albumin in the cases with albumin before the injection was made. They only found an increase of the urates and heightening of the specific gravity, no sugar and only a little albumin.

Regarding prophylaxis. The antitoxin does not immunize. Diphtheria is diphtheria, whether you use one c.c. or 1000c.c. If you treat the diphtheria with a curative dose of antitoxin and expose the patient a month afterward to diphtheria, he will surely get diphtheria. I have in my room the record of the case of a little fellow who was exposed. He was left quite sick, locked up in a house with another case of diphtheria. In this case it had no permanent effect.

I use the Löffler solution, or the guiacol, or—and it is as good as anything—the tincture of the chlorid of iron.

The post-diphtheritic palsies. We hear more of these than formerly because the patients died, before they had these palsies. We have multiple neuritis, ozena, inflammation of the middle ear, which would have been seen before the use of the diphtheritic antitoxin had the cases lived. But now the toxins have been neutralized by the antitoxins and we have a clearer field to work in. If antitoxin has any virtues it antagonizes the Klebs-Löffler bacillus and nothing else. If we find a mixed infection, then is the time to give the iron.

Another point is the reduction of the time the tube is needed in laryngeal stenosis since the use of antitoxin. In my own cases I have found the reduction has been sixty-nine hours. I could take the tube out on the third or fourth day. Often there is no indication for intubation or tracheotomy.

All my cases have been substantiated by microscopic examination. If we did not have the evidence of diphtheria, we would believe we had been treating follicular affections or something else for diphtheria. We probably all have bacilli in the throat, but when you have set up a chemic or mechanic action in the throat, the disease immediately comes forth and there you have diphtheria which you wonder you did not see before. It is the same thing in pneumonia and other contagions. I have no doubt you could find the pneumococci or the bacilli of diphtheria in my throat. Perfectly healthy gentlemen and phthisical patients have had the secretions examined in the laboratories, and the returns have been made that they were very virulent cases of diphtheria.

I do not not stand alone in the matter of intubation. I have here a letter from a doctor who in his last thirty cases has saved twenty. The method we pursue now in Philadelphia, is this: If we have a case with the clinical manifestations of diphtheria, we make the injection first and make the bacteriologic examination afterward.

As to the quotations by Dr. Lee. Dr. Lennox Browne's book is out and has had sufficient criticism. Dr. Winters, I understand, has been entirely crushed and has come out in favor of the antitoxin. Professor Welch has quoted every authority, French, German, Austrian and Russian, who has had anything to do with the antitoxin, in all, 10,000 cases and now

favors antitoxin. Some people have a sort of fever in the antivivisection line, but, he says, it is to the glory and honor of the bacteriologists the antitoxin has come forth. The statistics of Dr. Welch of the Johns Hopkins Hospital are unique. He told me he had to go to other treatment, but with the other treatment his mortality rate has increased from 29 to 33 per cent. Kitasato of Japan, Metschnikoff, Kasmann, Wassermann, Ehrlich and others have given statistics showing a decrease in the death rate. Statistics often lie, but there is certainly great similarity between them; and if they are all liars, I am very glad to be counted among such a class.

DR. ROSS, Kokomo, Ind.—Unfortunately in the little city where I live we have had a good deal of diphtheria. The physicians have in almost every case injected antitoxin early. My partner and myself have probably treated forty-five or fifty cases and have in every case injected the antitoxin. We have sometimes used the Behring preparation and sometimes the preparation made in New York. We have tried to use the utmost antiseptic and aseptic care. We have not had as much irritation about the point of injection as I have seen from a mosquito bite. We have only once seen an erythema, which was slight and disappeared in a few hours. We have not had any trouble from shock or other adverse symptoms. We have never failed to see, within thirty-six hours, the temperature become normal and the membrane begin to disappear. We have not lost a case of diphtheria. No regular physician in our city, of the 200 or more cases treated, has lost a case of diphtheria during this epidemic. Perhaps a dozen cases have died but they were cases treated by irregulars, who refused to use the antitoxin. We have accepted what has been promulgated by the investigators and teachers; we have tried to use suitable precautions, and we have had good results. I shall certainly go on, not at all deterred by the frequency of the word "poison" in the paper by Dr. Elmer Lee, of Chicago. I have not seen nor heard of a case of disease of the kidneys following the injection of antitoxin. Heretofore, in cases treated by the old method, frequently after a patient was discharged and I supposed the disease and my treatment were ended, I have been called back to see the little patient with pulseless wrist and pale countenance, and witness its death in a short time. Such a thing has not occurred in the cases we have treated with the antitoxin.

I was called to see a case of laryngeal diphtheria. The case called for intubation or tracheotomy. The condition of the patient was such I thought neither procedure promised much. We tried intubation without success. We prayed to be permitted to use the antitoxin. The child was apparently almost in the agonies of death. After assuring the mother of the necessity, we were permitted to use the antitoxin. In the evening we made the injection. The next morning, instead of finding the child dead, we found it sitting up in bed, playing, and breathing as if nothing had happened to it.

DR. GRAY—We have had, during the past year, an epidemic of diphtheria. I have seen from fifty to seventy cases treated with the antitoxin, and have given it personally in twenty-eight cases, of which only one died. In the fatal case death occurred one hour after the administration of the antitoxin. In that case I gave it only at the earnest solicitation of the family, knowing at the time it would be useless.

I found a child 2½ years old suffering from diphtheria. The little patient had been sick about three days and was cyanotic. In the same bed during those three days another child, of 4 or 5 years, had been sleeping. I administered 2,000 units of the antitoxin and in eight hours gave 1,500 units. In a week the child was well. I had cultures made from the throat of the child that slept with him and also from the father and mother, in which the Klebs-Löffler bacillus was found, but they did not develop diphtheria.

At first the doctors were afraid of it and gave small doses. I have found with the large dose at first we have much better results. I give all my injections into the interscapular region, first washing the back of the child with alcohol. I use an aseptic needle, first soaking it in a weak carbolic acid solution and then washing it with alcohol. I have never had a rash nor the slightest indication of abscess. In the case of a child 4 years of age, sick three days, the larynx, nasal passages and pharynx were involved. The child was cyanotic, with a weak, thready pulse of 140, temperature 103½ degrees, albumin in the urine, and apparently near death. I injected 1,500 units. In eight hours afterward there seemed to be some improvement and I repeated the antitoxin, and again in the course of twenty-four hours, and the child recovered with a subsequent mild nephritis. I have given small doses of brandy to support the heart. Sometimes I have stuck to the iron. Of the twenty-eight cases, I do not think one (except the one that died) did not recover within a week or ten days so it could be on the street.

DR. THOMASON, Albion, Mich.—I can only give some deductions from my own clinical experience. A year ago, in Washington this same subject was discussed. The antitoxin treatment was then in its infancy. Those of us who defended the antitoxin at that meeting had considerable opposition to meet. The fate of the Koch tuberculin was talked about, and they were all afraid of antitoxin. When the papers were read giving favorable results in a number of cases, and I gave my limited experience of some twenty cases in the same epidemic, in the first few of which (treated before we were able to obtain the antitoxin) there was a mortality of 50 per cent. and in the others, with the antitoxin, 100 per cent. recovered, many thought I was prevaricating. But now we feel antitoxin is very nearly a specific in the treatment of diphtheria. A few cases are reported of death as the result of antitoxin, but it is questionable whether death in those cases was due to antitoxin. But even if it has killed a few, it has saved many. The same applies to cocain. Cocain killed a patient just as he was leaving my office, but for that reason I shall not discard cocain. I take the same aseptic precautions I would take in an abdominal section. I make the injection into the deep muscular tissues of the subscapular region. Prior to the introduction of antitoxin, I operated in twenty cases, every one of which was fatal. Since the introduction of antitoxin I have had four cases and all recovered.

I know I am not in harmony with some of the gentlemen, in regard to it being an immunizing agent. I have used it as an immunizing agent and, rationally or irrationally, I have had justifiable results. In one family of six children, five children had diphtheria and one did not. I gave an immunizing dose to that child and it escaped; and I also gave the parents injections and they escaped. In a family of five children in which three had the disease, I gave immunizing doses to the remaining two and they escaped. I have never had any bad results but an erythema.

The deaths in diphtheria, after the use of antitoxin, I believe to be due to secondary causes. I never neglect the general treatment. The antitoxin arrests the primary trouble, that is all; consequently I stick to the old chlorid of iron treatment as tenaciously as ever.

DR. J. A. LARRABEE, Louisville, Ky.—I would like to ask one question of Dr. Thomason. The Doctor speaks of results in immunizing. How is it known these cases would have had diphtheria if he had not immunized them?

DR. THOMASON—I do not know. It may be rational or irrational, but I have used the antitoxin with the results I have given.

DR. W. J. BELL, Atlanta—In 1894 we had an epidemic in an institution with which I was connected. There I had an occasion to use the antitoxin. The conclusion reached there, by Dr. Parks and Dr. Peck, was conclusive, that antitoxin had an

antitoxic effect. The statistics bear out that conclusion. During my term there I held to the iron treatment, as was insisted upon by our Resident, and it was certainly indicated. I noticed these cases bear iron to an enormous degree of tolerance. I gave at first a small dose, increasing to forty drops in children 18 months to 2 years old. The cases did well. In a great number of those cases I was satisfied I had not only a local effect from the iron but also a good general effect on the system. It seems to me our best result would be obtained if we could use the antitoxin and so saturate the system of those exposed we could render them temporarily immune. I do not think there are any who claim the immunity is permanent, but there is a temporary immunization. Therefore, in those cases where the Klebs-Löffler bacilli are found in the throat, the antitoxin should be used, in smaller doses than for a regular case, but at regular intervals, immunizing the general system. During the first part of the epidemic we had our work done in New York, but afterward we established a laboratory and did the examining for the institution. There were some five hundred children in the institution. We had a regular quarantine and an intermediate quarantine, and we went over the cases as well as possible. We had spots of infection in a number of places through the wards and so could not locate the point of infection. We selected forty cases, where the Klebs-Löffler bacilli were found, and used the usual treatment. Out of this number only two cases developed, which seems conclusive evidence that we obtained an immunizing effect from the antitoxin.

Dr. H. E. Garrison, Dixon, Ill.—In our town we have not found the Klebs-Löffler bacilli, but the antitoxin has been used with wonderful results. We had an examination made by the State Board of Health, of Illinois, and they found the staphylococci only. One or two cases died without the antitoxin and five or six with the antitoxin. There is a population of about 8,000, of which number not less than 1,000 have had a sore throat.

Dr. Baker, Erie, Pa.—I think the cases of infectious diseases may be divided into three classes: 1, cases which are mild and will recover at any rate; 2, cases that may or may not recover; 3, cases that will die. To simply say a case is diphtheria, the antitoxin is given and the case recovered, gives no information whatever. But if you treat a series of cases such as I would include in the third section, and get good results, the statistics are of some value. I saw 150 cases, out of which three or four to me meant something. One boy I remember especially was very sick. We had him early and administered the antitoxin thoroughly, but he died. I do not think, from the observations there, I saw the antitoxin do anything that has not been duplicated without it. In private practice my experience covers some fifteen cases. The theory is seductive. The line of treatment is on a trunk line and it is exceedingly probable it will be worked out in time. Whether that time has arrived is doubtful. I think the question of immunization is answered absolutely by the fact the disease does not immunize itself.

Dr. Hodgkis, Connecticut—I had the opportunity of witnessing a number of cases of diphtheria, and being a little distrustful of the results of antitoxin, I allowed one case I considered mild and would get well if left to time, to go on for a period of eighteen days, with a great deal of diphtheritic membrane covering the uvula, soft palate, tonsils and pharyngeal walls, and at the end of that time there was no disappearance of the membrane under the old treatment. Paralysis having resulted, I considered the case going on to the worst and it was a proper time to use the antitoxin. I had previously used it in other cases. After using 10 c.c., on the following day the membrane had disappeared from the uvula and the soft palate. On the next day we used 5 c.c. and on the following day all the membrane had disappeared. This is an illustration showing positively the disappearance of the membrane after the use of the antitoxin.

Dr. D. C. Wilson, Ironton, Ohio—We had a severe epidemic in our town during the past winter. The first few cases I lost. I immediately ordered antitoxin and lost no cases in the some sixty cases treated after that. One child contracted the disease. Inside of eight hours another of the same family contracted diphtheria, and I injected the ten other children and none of them contracted the disease. But the father contracted the disease. In his case I did not use the antitoxin at first and he grew worse until I thought it unjustifiable to wait longer and injected it, with recovery. I was called to a case of laryngeal diphtheria. The child was cyanotic. The consulting physician refused to use antitoxin but I insisted. The next morning the child seemed somewhat better. Later I injected the child again, and the child was soon up and about the house. I have had no bad results. I had in one case an erythema follow. I use the injection in the side. I first thoroughly antisepticize the chest, brush off the skin with alcohol, and use the carbolic solution. I have not sealed up the wounds at all.

Dr. Knipe, Norristown, Pa.—I merely would like the consensus of opinion about this. One man claims antitoxin could not immunize simply because the disease does not immunize itself. Theoretically, my own impression is that ordinarily diphtheria does immunize against another attack. Dr. Garrison has reported a number of cases of diphtheria in which the bacillus was not found. These may have been only cases of tonsillitis. But I believe true diphtheria does immunize as much as smallpox. I believe the statistics from the German army show a good mark of vaccination is a greater security than having had smallpox itself.

Dr. Edwin Klebs, Citronelle, Ala.—Permit me to make a few remarks on this question of immunizing. We have very different qualities of immunity in the different forms of infectious disease. We can not compare, in this point, diphtheria and smallpox. We would be very glad if we had such a high degree of immunity in diphtheria as in smallpox. But some gentlemen have thought they have immunized. Some members of a family have diphtheria and in the other members of the family they found the bacilli, and they injected them with the serum and they did not get diphtheria. In Zurich, for weeks after diphtheria in a family we found in the children who did not have diphtheria the diphtheria bacilli, but they did not have diphtheria although they were not injected. We have two sides to this question of infection; the germ on one side and the body on the other. We must consider, first, sufficient infectionability of the germ; and second, sufficient susceptibility of the body. We know an infectious germ can be in the nose of a healthy child and not cause diphtheria.

Dr. Elmer Lee, Chicago—There is not much more to be said. The position taken in the paper read by me, *is correct*. It is admitted, in that paper, that diphtheria is treated by the use of antitoxin, seemingly with favorable results. If you undertake to say to me or to the world, that that treatment is based upon scientific knowledge, it is my contention that it is an incorrect statement. If you base it upon empiricism, there is nothing more to be said. It is contrary to physiologic law. Physiologic law is the law of our nature and being. That an impurity will secure purity, is not the lesson we learn by watching the bubbling water as it comes out of the side of the hill, that is made muddy by the foot-print of the cattle. The stream will clear itself if we will only let it alone.

There is one weak point in my paper. I know my weak points better than the audience. The weak point is, while criticising antitoxin, no substitute has been offered to you. The old treatment, as it is called, is not satisfactory.

Here is a letter, that happens to come in, fortunately, to save the day because of the ferocious attack by the gentleman from

Philadelphia. This letter is from Dr. Joseph Winters, Professor of Diseases of Children and head of the staff of the Willard Parker Hospital, New York. The communication is of recent date and is as follows: " . . . It seems to me that one of the main features of this discussion, is the increase of the number of cases of reported diphtheria, as a result of the present method of diagnosis." That method of diagnosis is the one referred to in my paper as the bacteriologic, as distinguished from the clinical diagnosis. Dr. Winters says, further: "I spent three and a half months in the hospitals of Europe, last summer, making a constant study of the results of the antitoxin treatment, and am convinced that there is, absolutely, no value in it." It don't make any difference, gentlemen, Dr. Winters is an experienced man. He is fifty years old, and his judgment is not puerile and it is not to be neglected.

Now, the object of bringing out the paper before you to-day was not to antagonize the profession nor to indulge in any aspersions. It was to call your attention to just exactly what is true. In so much as you have spoken your views, in so much you have delighted me and accomplished that which was intended and expected by the paper. It is not my purpose nor in my power to answer the objections to the paper nor to go into the clinical part of the disease.

In conclusion, it is my purpose to present to you, at the next annual meeting, a substitute for antitoxin, a complete method by which all cases in my practice have recovered quickly and surely, and pleasantly and scientifically.

DR. W. A. DIXON, Ripley, Ohio—I wish to say I admire Dr. Lee for his bold paper yesterday. But if a man has a conviction and is bold enough to state it, he ought to be commended for it. And I expect he is about half right.

THE CHAIRMAN—He certainly put himself in a very trying position.

DR. DIXON—I have never yet had an opportunity to test antitoxin, because we have had no true diphtheria. But every man has his fad and if you start him in the right place he is a "crank," and I have my "cranky" ideas about diphtheria. I believe diphtheria is not primarily a disease of the human family at all, but a disease of animals, obtained from birds, cats, rabbits, rats, etc. I have had occasion to dissect the pet animal of a child seized with true diphtheria. The child was isolated in the country and had no opportunity whatever to be infected from other children. Unless we can devise some theory to explain an autoinfection or the presence of the bacilli in a healthy place in the country, we must look for the contagion in something else. The most noted case I can refer to is the case of a child 3 years old. Not being able to discover how it might have taken diphtheria, and believing as I have stated, I asked if the child had a pet. The mother replied, "O yes, it has a pet cat that it carries in its arms continually and often takes to bed with it." I asked for the cat, and on examination I found it had enlarged glands and discharged at the nose. I took it home, dissected it, examined the membrane microscopically and found it had true diphtheria. Therefore I believed the child obtained its diphtheria from the cat. I have had occasion to report several cases of like kind. In one case the canary bird was sick prior to the child; in one or two cases turkeys were sick prior to the child, etc. I read a paper on this subject at Milwaukee, in the Section of Diseases of Children, but I suppose it must have been a very poor one, for it did not draw out any comments and I have not heard anything from it since. But I am just as firm a believer as ever that the contagion of diphtheria is often derived from an animal or bird. Hence we might have some reason, on that theory, to believe in the virtue of antitoxin, just as we have reason to believe in the value of vaccine as a remedy to prevent smallpox. Those who have read extensively upon the subject of diphtheria, know the first epidemic in this country was brought by the importation of birds, particularly turkeys.

THEORY OF SERUM THERAPY; CONTRIBUTION FROM THE BACTERIOLOGIC LABORATORY OF THE CITY OF PHILADELPHIA.

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Some of the theories which have been advanced to explain immunity from infectious diseases have a bearing upon the production of antitoxin; others leave this out of consideration. It is evident that no theory can stand if it offers no explanation of the reason why it is possible to use the blood serum of inoculated animals to protect and cure other animals and human beings. It will be my purpose in this paper to put the various theories, that have been advanced, to this test. Some of the theories merely attempt to explain why the bacteria do not grow in the body of non-susceptible animals and leave out of account the neutralization of the disease producing products, and for this reason fail to be universally applicable.

1. The exhaustion theory of Pasteur claims that the bacteria are unable to grow in the body of an animal that has suffered from an attack of the microörganism in question, because all of the necessary food has been exhausted by the first attack. There are other reasons for discarding this theory, but it is evident that it offers no explanation of the production of substances in the blood which can be used in treating other animals. Even if it should explain the reason why recovery protects the animal itself from subsequent invasion it offers no explanation why the serum of this animal will counteract the poisonous properties of the bacteria in another animal.

2. The accumulation theory of Chauveau comes somewhat nearer an explanation, though not as it was originally conceived. According to the original conception the waste products of the growth of the bacteria in the body simply accumulate till the tissues become so saturated with the effete material that the bacteria are unable to grow. The bacteria, in other words, are poisoned by their own excreta. In order to make this theory fit the facts it would have to be extended so as to mean that not only the bacteria are unable to grow on account of the accumulation of effete products but also that these products neutralize the poisonous products of the bacteria. This enlargement of the theory is practically what has been done in the following:

3. The theory of special organs, Brieger, Kitasato and Wassermann, claims that there are probably two substances in every culture of bacteria, viz., a disease producing substance and a substance tending to counteract this. It is supposed that the disease producing substance is destroyed by certain organs of the body, notably the thymus gland, and that the other substance, the antidote, is liberated,

4. The accommodation theory claims that the tissues of the body gradually become accustomed to the bacteria and their products just as men become habituated to large doses of arsenic, opium or other poisons. But this explanation is not satisfactory because in the production of immunity there is always a crisis observable. The animal undergoing inoculation often more or less suddenly shows a great power of resistance. The process is not gradual enough for it to be accounted for by this theory.

5. Pfeiffer's theory of special enzymes claims that in animals gradually inoculated with the products of the cultures of bacteria two substances are developed: a. A substance capable of being converted into the germicide. b. The germicide itself. The former is converted into the latter by special ferments residing in the animal tissues. The former is called the immunity substance in contradistinction to the latter which is called the germicide. It is contended at least for typhoid fever and cholera that blood serum taken from animals inoculated for a long time with cultures of the bacteria of these diseases contains a certain amount of both these substances, and if an ordinary susceptible animal is inoculated with cultures of typhoid fever or cholera and is given a dose of the protective serum at the same time that the germicide acts at once, and that the immunity substance becomes converted into the germicide, thus furnishing an additional supply. Animals that have been gradually inoculated with the products of typhoid or cholera cultures are supposed to have the immunity substance stored up in their tissues and that this is converted into the germicide when the animal is inoculated with virulent cultures. The action is specific, *i. e.*, animals immunized from cholera have the immunity substance of cholera, and the same with typhoid fever.

6. Under the cellular theory are embraced: a. The phagocyte theory of Metschnikoff. b. The starvation theory of Grawitz. c. The theory of the alexins of Hankin.

a. The phagocyte theory has been more actively advocated and more vigorously assailed than perhaps any other theory. According to this theory, the white corpuscles of the blood destroy the bacteria. The corpuscles concerned are believed to be the polynuclear leucocytes and the large mononuclear; the lymphocytes are not supposed to be concerned. The leucocytes are supposed to actually devour the bacteria at once, or to produce degeneration of the bacteria first and devour them afterward. In the latter case the leucocytes are supposed to break up and liberate a substance which causes the bacteria to degenerate and then fresh leucocytes appear to devour the degenerated bacteria. The breaking up of the leucocytes he calls phagolysis.

b. According to Grawitz's starvation theory the leucocytes deprive the bacteria of nutrition.

c. Hankin's theory, which is advocated by Buchner and others, claims that the neutrophilic leucocytes break up and liberate a substance that destroys the bacteria. Hankin's original statement was that the eosinophilic leucocytes break up and liberate alexins, but he has retracted this statement and his present view is more in accord with Metschnikoff's theory of phagolysis.

7. The humoral theory of Behring claims that there is developed a substance in the humors of the body that neutralizes the poisonous products of the bacteria. It is believed that this substance is generated by the fixed cells of tissues rather than by the leucocytes.

Opinion among bacteriologists is now practically divided between the humoral and the phagocyte theory. Both have been ably supported and both have been vigorously attacked. It is possible that in the production of immunity many of the explanations advanced may play a part. It may be that no one of them is sufficient to explain all the phenomena.

REPORT OF THE AMERICAN PEDIATRIC SOCIETY'S COLLECTIVE INVESTIGATION INTO THE USE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA IN PRIVATE PRACTICE.

REPORTED AT THE EIGHTH ANNUAL MEETING HELD AT MONTREAL, CANADA, MAY 26, 1896.

This subject was chosen by the officers of the Society for its eighth annual meeting, with the belief that a large amount of valuable experience, not otherwise available, might in this way be reached and collated. It was also believed that a more trustworthy estimate of the value of the serum treatment of diphtheria might thus be obtained than by statistics taken from hospital practice. There are very few hospitals in America that receive diphtheria patients, and the conditions under which patients are admitted to hospitals, and the surroundings while there, are so different from those of private practice, that the measure of success in hospital cases can not be taken as an index of the results which have been obtained upon this side of the Atlantic with the new treatment.

In order, therefore, to obtain an expression of opinion from American physicians as to the serum treatment, after what had been, with most of them, their first year's experience, a circular letter was prepared and issued by the Committee early in April. This was distributed through the members of the Society as widely as could be done during the time allowed. An attempt was made to reach as many physicians as possible who had had experience with the remedy.

The first surprise of the Committee was in learning how very widely the serum treatment had been employed, especially in the Eastern and mid-Western States. With more time, the number of cases collected might easily have been doubled and perhaps trebled; but enough reports have come in to enable one to see what opinion was held on the 1st of May, 1896, by American physicians who have used this remedy.

The circular letter asked for information upon the following points: Age; previous condition; duration of disease when the first injection was made; the number of injections; the extent of the membrane— tonsils, nose, pharynx and larynx; whether or not the diagnosis was confirmed by culture; complications or sequelæ, viz., pneumonia, nephritis, sepsis, paralysis; the result; and remarks, including other treatment employed, the preparation of antitoxin used, and general impression drawn from the case.

Reports were returned from 615 different physicians, with 3,628 cases. Of these, 244 cases have been excluded from our statistical tables. These were cases in which the disease was said to have been confined to the tonsils and the diagnosis not confirmed by culture, and therefore open to question. A few cases were reported in such doubtful terms as to leave the diagnosis uncertain. The figures herewith given are therefore made up from cases in which the diagnosis was confirmed by culture (embracing about two-thirds of the whole number) and others giving pretty clear evidence of diphtheria, either in the fact that they had been contracted from other undoubted cases, or where the membrane had invaded other parts besides

the tonsils, such as the palate, pharynx, nose, or larynx. It is possible that among the latter we have admitted some streptococcus cases, but the number of such is certainly very small.

There are left then of these cases, 3,384 for analysis. These have been observed in the practice of 613 physicians, from 114 cities and towns, in fifteen different States, the District of Columbia and the Dominion of Canada.

In the general opinion of the reporters, the type of dipthheria during the past year has not differed materially from that seen in previous years, so that it has been average diphtheria which has been treated. If there is any difference in the severity of the cases included in these reports from those of average diphtheria, it is that they embrace a rather larger proportion of very bad cases than are usually brought together in statistics. The cases according to the extent of the membrane, are grouped as follows: In 593 the tonsils alone were involved. In 1,397 the tonsils and pharynx, the tonsils and nose, the pharynx and nose, or all three were affected. In 1,256 cases the larynx was affected either alone or with the tonsils, pharynx and nose, one or all. In many instances the statement is made by the reporters, that the serum was resorted to only when the condition of the patient had become alarmingly worse under ordinary methods of treatment. This is shown by the unusually large number of cases in which injections were made late in the disease. Again, many physicians being as yet in some dread of the unfavorable effects of the serum have hesitated to use it in mild cases, and have given it only in those which from the onset gave evidence of being of a severe type. The expense of the serum has unquestionably deterred many from employing it in mild cases. These facts, it is believed, will more than outweigh the bias of any antitoxin enthusiasts by including many mild cases which would have recovered under any treatment. It will, however, be remembered that tonsillar cases not confirmed by culture have not been included.

Only two reports embracing a series of over 100 cases have been received, most of the observers having sent in from five to twenty cases, although there are many reports of single cases, particularly of single fatal ones.

In addition to this material which has come in response to the circular, there have been placed at the disposal of the Committee by the courtesy of Dr. H. M. Biggs, 942 cases treated in their homes in the tenements of New York. Of these, 856 were injected by the corps of inspectors of the New York Health Board, upon the request of the attending physician, and eighty-six others were treated by physicians receiving free antitoxin from the Health Board. In the first group the diagnosis of diphtheria was confirmed by culture in every case, and in all of the latter except twenty-six; in these the diagnosis rested upon extensive membranous deposits or laryngeal invasion. The cases of the New York Health Board were of a more than ordinarily severe type, 485 or more than 50 per cent. of these being reported as being in bad condition at the time of injection; to mild cases the inspectors were not often called. Further, an unusually large number of them (38 per cent.) were injected on or after the fourth day of the disease. In 182 of these cases only the tonsils were affected; in 466 the tonsils with the pharynx or nose, the pharynx and nose, or all three; in 294 the larynx was invaded with or without disease of the tonsils, nose, or pharynx.

Through the courtesy of Dr. Biggs, the Committee is able to include also a partial report upon 1,468 cases from Chicago, treated in their homes in that city by a corps of inspectors of the Health Department. It was the custom in Chicago to send an inspector to every tenement-house case reported, and to administer the serum unless it was refused by the parents. These cases were therefore treated much earlier, and the results were correspondingly better than were obtained in New York, although the serum used was the same in both cities, viz., that of the New York Health Board.

TABLE I.—DAY OF INJECTION AND RESULT.

	Injected on 1st Day.			Injected on 2d Day.			Injected on 3d Day.			Injected on 4th Day.			Injected on 5th Day.			Day of Injection Unknown.			Totals.		
	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.
The Committee's Report	764	38	4.9	1,065	89	8.3	620	79	12.7	336	77	22.9	390	152	38.9	215	15	7.0	3,384	450	13.0
New York Health Board	126	11	8.7	215	26	12.0	228	37	16.6	153	32	20.9	203	59	29.0	17	4	23.5	942	169	17.8
Chicago Health Board	106	0	0	336	5	1.5	660	18	2.7	269	38	14.1	97	33	34.0	0	0	0	1,468	94	6.4
Totals	996	49	4.9	1,616	120	7.4	1,508	134	8.8	758	147	20.7	690	244	35.3	232	19	8.2	5,794	713	12.3

TABLE III.—AGE AND RESULT OF TREATMENT.

	0 to 2 Years.			2 to 5 Years.			5 to 10 Years.			10 to 15 Years.			15 to 20 Years.			20 Years and Over.		
	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths	Mortality, Per cent.	Cases.	Deaths.	Mortality, Per cent.
Committee's Report	631	137	21.7	1,276	175	13.7	883	108	12.2	276	19	6.8	112	4	3.6	214	9	4.2
New York Health Board	236	65	27.5	466	83	17.8	178	21	11.2	29	0	0.	11	0	0.	22	0	0.
Totals	867	202	23.3	1,742	258	14.7	1,061	129	12.1	305	19	6.2	123	4	3.2	236	9	3.8
Moribund	43			59			59			9			0.			4		
Mortality excluding moribund cases			19.2			13.3			8.7			3.3			3.2			2.1

THE RESULT AS INFLUENCED BY THE TIME OF INJECTION.

In Table I, are given the results obtained in these three different groups of cases, classified according to the day on which they received the first injection of serum antitoxin.

The grand total gives 5,794 cases with 713 deaths, or a mortality of 12.3 per cent., including every case returned; but the reports show that 218 cases were moribund at the time of injection, or died within twenty-four hours of the first injection. Should these be excluded there would remain 5,576 cases (in which the serum may be said to have had a chance) with a mortality of 8.8 per cent.

Of the 4,120 cases injected during the first three days, there were 303 deaths—a mortality of 7.3 per cent., including every case returned. If from these we deduct the cases which were moribund at the time of injection, or which died within twenty-four hours, we have 4,013 cases, with a mortality of 4.8 per cent. Behring's original claim, that if cases were injected on the first or second day the mortality would not be 5 per cent., is more than substantiated by these figures. The good results obtained in third-day injections were a great surprise to your Committee. But after three days have passed the mortality rises rapidly, and does not differ materially from ordinary diphtheria statistics. Our figures emphasize the statement so often made, that relatively little benefit is seen from antitoxin after three days; however, it must be said that striking improvement has in some cases been seen even when the serum has been injected as late as the fifth or sixth day. The duration of the disease, therefore, is no contraindication to its use.

THE INFLUENCE OF BACTERIOLOGIC DIAGNOSIS UPON THE STATISTICS.

This is shown in Table II.

TABLE II.—DIAGNOSIS CONFIRMED BY BACTERIOLOGIC EXAMINATION.

Committee's Reports . .	2,453	cases;	302	deaths;	mortality,	12.3	per cent.
N. Y. Board of Health . .	916	"	160	"	"	16.9	"
Chicago Board of H'lth.	1,468	"	94	"	"	6.4	"
Totals	4,837	"	556	"	"	11.4	"
(Excluding 145 cases which were moribund or which died in twenty-four hours)					"	8.7	"

DIAGNOSIS FROM CLINICAL EVIDENCE ONLY.

Committee's Reports . .	931	cases;	148	deaths;	mortality,	15.7	per cent.
N. Y. Board of Health . .	26	"	9	"	"	34 6	"
Totals	957	"	157	"	"	16.3	"
(Excluding 72 cases either moribund or dying in twenty-four hours)					"	9.6	"

In the cases in which the diagnosis was not confirmed by a bacteriologic examination the mortality is thus 5 per cent. higher than in the bacteriologic cases. This difference is to be explained by two facts: first, as already stated, that we have excluded from our reports all tonsillar cases (and hence most of them very mild ones) not confirmed by bacteriologic examinations; and secondly, by the fact that this group of cases comprises those treated in the country where physicians have hesitated to use antitoxin unless the type of the disease was a grave one, and where also a large proportion of the injections were made later than in the cities. However, should we leave out the moribund cases, the mortality is but 9.6 per cent., which differs but slightly from the cases confirmed by bacteriologic diagnosis.

In our subsequent statistics we shall consider together all the cases bacteriologically confirmed and otherwise, as the statistics are not materially altered by this grouping.

THE RESULTS AS MODIFIED BY THE AGE OF THE PATIENTS.

Unfortunately the ages have not been furnished in the report of the Chicago cases, and we have therefore only the cases reported to the Committee, and those from the New York Board of Health for analysis. In Table III, are shown the mortality of the different ages grouped separately.

The highest mortality is seen as in all reports to be in the cases under two years, but including all those returned, even those that were moribund when injected, the death rate was but 23.3 per cent. (21.7 per cent. of the Committee's cases), while if we exclude cases moribund when injected or dying within the first twenty-four hours, it falls to 19.2 per cent.

After the second year there is noticed a steady decline in mortality up to adult life. In many of the reports previously published, the statement has been made that no striking improvement in results was observed in adult cases treated by the serum. Our figures strongly contradict this opinion. Of 359 cases over 15 years old which were returned, there were but thirteen deaths. That the reader may judge for himself how far antitoxin is to be held responsible for the result a brief summary of these thirteen cases is appended:

Case 1.—Fifteen years old; injected on the fourth day; membrane covering tonsils and pharynx; profoundly septic, sinking rapidly when injected; died in two hours. "My only death in seventeen cases." (Jones, Gloucester, Mass.)

Case 2.—Forty-four years old; injected on the fourth day; membrane on the tonsils and pharynx; in bad condition; died three hours after injection. The tonsils had been previously incised, the early diagnosis having been quinsy.

Case 3.—Thirty-one years old; injected on the sixth day; membrane on the tonsils, nose, pharynx, and larynx; intubation; sepsis; in bad condition; lived eight hours after injection.

Case 4.—Thirty-five years old; injected on the fifth day; membrane on the pharynx and nose(?); in bad condition; septic; died in twelve hours.

Case 5.—Sixty years old; in bad condition; had serious mitral regurgitation; injected on the fourth day; membrane covering tonsils, pharynx, and larynx; died from heart failure on following day.

Case 6.—Sixty years old; "kidney trouble for years"; injected on the third day; very extensive membrane, covering tonsils, pharynx, and nose; profound sepsis; in bad condition; dies suddenly on the day after injection.

Case 7.—Seventeen years old; in bad condition: convalescing from measles; enormous adenopathy; profound sepsis: exceedingly high temperature; membrane covering tonsils and nose; injected at the end of forty-eight hours; three injections, temporary improvement after each one; duration of life not given.

Case 8.—Fifteen years old; in bad condition; injected on the ninth day; membrane covering tonsils, nose pharynx, and larynx; no operation; enormous infiltration of the tissues of the neck; nephritis; sepsis; lived four days and died of sepsis.

Case 9.—Twenty years old; injected on the third day; membrane upon the tonsils, nose, pharynx and larynx; "a stubborn patient who got up before he was allowed, and died suddenly after it."

Case 10.—Twenty-five years old; injected on the fifth day; membrane covering both tonsils, entire pharynx, and completely occluding nose; nephritis and sepsis; throat cleared off entirely; died suddenly on the fourteenth day from cardiac paralysis.

Case 11.—Nineteen years old: injected on the fifth day; membrane upon the tonsils and pharynx; profound sepsis; duration of life unknown.

Case 12.—Twenty-two years old; injected on the fourth day; membrane upon the tonsils and gums; sepsis; died on the sixth day.

Case 13.—The well-known Brooklyn case, reported in 1895. Girl, 16 years old, who died suddenly ten minutes after injection.

Such are the adult cases which antitoxin failed to cure. Four of them were moribund at the time of injection, no one of them living over twelve hours. Two, both 60 years old, were already crippled by previous organic disease, one of the heart and the other of the kidneys. In the measles case there was undoubted evidence of streptococcus septicemia. Only two of the cases were injected as early as the third day; three of them on the fifth day, and one on the ninth day. Omitting the four moribund cases the the mortality of 355 adult cases treated with the serum is 2.5 per cent.

PARALYSIS.

Reliable data upon this point and those hereafter to be mentioned are to be had only from the 3,384 reports returned to the committee. Of these paralytic sequelæ appeared in 328 cases, 9.7 per cent. Of the 2,934 cases which recovered, paralysis was present in 276, or 9.4 per cent. Of the 450 cases which died, paralysis was noted in fifty-two, or 11.4 per cent.

The variety of the paralysis and the date of injection is shown in the following table:

TABLE IV.—VARIETY OF PARALYSIS AND THE DAY OF INJECTION.

RECOVERY CASES.	CASES.	DAY OF INJECTION. 1st Day.	2d Day.	3d Day.	4th Day.	5th Day.	Unknown
Paralysis mentioned (variety not specified).	132	8	32	32	19	16	23
Throat only (aphonia, nasal voice or regurgitation)	114	16	21	25	11	16	24
Extremities	14	3	5	2	. .	3	1
Ocular	11	. .	4	3	1	2	1
General (multiple neuritis)	4	. .	1	2	1	. .	. .
Sterno-mastoid	1	. .	1	. .	. .	. .	. .
FATAL CASES.							
Paralysis mentioned (variety not specified).	9	. .	3	2	1	2	1
[1] Cardiac, late after throat clear (in four of them throat also)	32	1	2	8	9	8	4
Throat only	6	. .	2	. .	. .	. .	4
General late	4	. .	1	. .	1	2	. .
Muscles of respiration	1	. .	1	. .	. .	. .	. .
Totals	328	28	75	76	43	49	59

Observations of some of the individual cases are interesting, particularly those of cardiac paralysis. It is twice stated that the child had gotten up and walked out of the house, where it was found dead. Twice death occurred after sitting up suddenly; once, on jumping from one bed into another. One patient of 20 years, got up contrary to orders and died soon afterward. Another patient was apparently well until he indulged in a large quantity of cake and candy, soon after which cardiac symptoms developed and he died shortly. One case was that of a woman, 60 years old, who had serious organic cardiac disease.

It is difficult from these statistics to state what protective power the serum may have over the nerve cells and fibers. Apparently this is not great unless the injections are made early in the disease, and even then in severe cases the amount of damage done to these tissues in twenty-four hours may be very great, even irreparable. Time is not the only element in estimating the effect of the diphtheria toxins.

Great discrepancy exists in the statements made regarding the frequency of paralytic sequelæ after diphtheria. In a series of 1,000 cases reported by Lennox Browne, paralytic sequelæ were present in 14 per cent. In 2,448 cases by Sanné, paralysis was noted in 11 per cent. In the series of cases here reported, the difference is slightly in favor of the antitoxin treatment, but paralysis is certainly frequent enough to show how extremely susceptible the nervous elements are to the diphtheria toxins. One thing is quite striking from a study of these cases, and that is the proportion that have died from late cardiac paralysis, That many of them would undoubtedly have succumbed earlier in the disease from suffocation (laryngeal cases) or diphtheritic toxemia, had the serum not been employed, is beyond the question. Although the serum is able to rescue even many such desperate cases it can not overcome the effects of the toxins upon the cells which have occurred before it was injected.

[1] Cases of heart failure occurring at the height of the disease have not been included here; although they are mentioned among the cases of cardiac paralysis in the table of fatal cases.

SEPSIS.

Sepsis is stated to have been present in 362 of the 3,384 cases, or 10.7 per cent. It was present in 145, or 33 per cent. of the fatal cases. Some explanation is necessary for a correct appreciation of these figures. The majority of the reporters, it is plain from their remarks, have not distinguished between diphtheritic toxemia and streptococcus sepsis. The former is certainly meant in the great majority of the cases. There is a very small proportion in which there is evidence of streptococcus sepsis. The six cases complicating measles and the five complicating scarlet fever, however, should possibly be included among this list.

NEPHRITIS.

The statements on this point are quite unsatisfactory. The reports state that nephritis was present 350 times, or in 10 per cent. of the cases. On the one hand it must be stated that the diagnosis of nephritis rests in many cases simply upon the presence of albumin in the urine; but, on the other hand, it is true that in a large number of the cases, more than half, no examination of the urine is recorded as having been made, so that it is impossible to state with anything like approximate accuracy, the frequency of nephritis in these cases. Of the 450 fatal cases, the presence of nephritis is mentioned without qualification or explanation in thirty-nine cases, these being usually put down also as septic, dying in the acute stage of the disease. There are fifteen fatal cases, however, in which the renal disease was stated as the cause of death. In no less than nine the nephritis occurred late in the disease, usually during the second or third week. In these fifteen cases the evidence of severe nephritis was conclusive, such symptoms being present as dropsy, suppression of urine, with coma or convulsions.

BRONCHO-PNEUMONIA.

Broncho-pneumonia is stated to have been present in 193 of the 3,384 cases, or 5.9 per cent., a remarkably small proportion when compared with hospital statistics. Among the patients that recovered broncho-pneumonia was noted 114 times, or in 3.8 per cent.; among the fatal cases seventy-nine times, or in 17.5 per cent., but in only about one-half of these was the pneumonia the cause of death. Of these, thirty-seven were laryngeal cases operated upon late, ten were septic cases and the the pulmonary disease was coincident with the height of the diphtheritic process. In seven pneumonia was independent of both the above conditions, occurring late in the disease in all but two.

LARYNGEAL CASES.

Of the 3,384 cases reported to the committee, the

larynx is stated to have been involved in 1,256 cases, or 37.5 per cent. This proportion is somewhat higher than is usual, and is partly explained by the fact that several physicians have sent in the reports only of their laryngeal cases. These laryngeal cases occurred in the practice of 379 physicians.

In 691, or a little more than one-half the number, no operation was done, and in this group there were 128 daths. In forty-eight of them laryngeal obstruction was responsible for the fatal issue, operation being refused by the parents or no reason for its being neglected having been given. In the eighty remaining fatal cases the patients died of other complications, and not from the laryngeal disease.

In the 563 cases, or 16.9 per cent. of the whole number, there was clinical evidence that the larynx was involved and yet recovery took place without operation. In many of these cases the symptoms of stenosis were severe, and yet disappeared after injection without intubation. No one feature of the cases of diphtheria treated by antitoxin has excited more surprise among the physicians who have reported them than the prompt arrest, by the timely administration of the serum, of membrane which was rapidly spreading downward below the larynx. Such expressions abound in the reports as "wonderful," "marvelous," "prepared to do intubation, but at my next visit the patient was so much better it was unnecessary," "in all my experience with diphtheria have never seen anything like it before," "no unprejudiced mind could see such effects and not be convinced of the value of the serum," etc.

In establishing the value of the serum, nothing has been so convincing as the ability of antitoxin, properly administered, to check the rapid spreading of membrane downward in the respiratory tract, as is attested by the observations of more than three hundred and fifty physicians who have sent in reports.

Turning now to the operative cases we find the same remarkable effects of the antitoxin noticeable. Operations were done in 565 cases, or in 16.7 per cent. of the entire number reported. Intubation was performed 533 times with 138 deaths, or a mortality of 25.9 per cent. In the above are included nine cases in which a secondary tracheotomy was done, with seven deaths. In thirty-two tracheotomy only was done with twelve deaths, a mortality of 37.4 per cent. Of the 565 operative cases, sixty-six were either moribund at the time of operation, or died within twenty-four hours after injection. Should these be deducted, there remain 499 cases operated upon by intubation or tracheotomy, with 84 deaths, a mortality of 16.9 per cent.

Of the 2,819 cases not operated upon, there were 312 deaths, a mortality of 11.3 per cent. Deducting the moribund cases, or those dying within twenty-four hours after injection, the total mortality of all non-operative cases was 9.12 per cent.

Let us compare the results of intubation in cases in which the serum was used, with those obtained with this operation before the serum was introduced. Of 5,546 intubation cases in the practice of 242 physicians, collected by McNaughton and Maddren (1892) the mortality was 69.5 per cent. Since that time statistics have improved materially by the general use (in and about New York, at least) of calomel fumigations. With this addition, the best results published (those of Browne) showed in 279 cases a mortality of 51.6 per cent.

Let us put beside the cases of McNaughton and Maddren the 533 intubations with antitoxin, with 25.9 per cent. mortality. With Browne's personal cases let us compare those of the fourteen observers who have reported to the committee ten or more intubation operations in cases injected with serum. These comprise 280 cases with sixty-five deaths, a mortality of 23.2 per cent. In both comparisons the mortality without the serum is more than twice as great as in the cases in which serum was used.

The reports of some individual observers concerning intubation with the serum are interesting:

Neff, New York, twenty-seven operations, with twenty-seven recoveries.

Rosenthal, Philadelphia, eighteen operations, with sixteen recoveries.

Booker, Baltimore, seventeen operations, with seventeen recoveries, including one aged ten months, and one seven and one-half months.

Seward, New York, eight operations, with eight recoveries.

McNaughton, Brooklyn, "In my last seventy-two operations without serum, mortality 66.6 per cent.; in my first seventy-two operations with serum, mortality 33.3 per cent."

O'Dywer, New York, "In my last 100 intubations, first seventy, without serum, mortality 73 per cent.; last thirty, with serum, mortality 33.3 per cent."

But even these figures do not adequately express the benefit of antitoxin in laryngeal cases. Witness the fact that over one-half the laryngeal cases did not require the operation at all. Formerly 10 per cent. of recoveries was the record for laryngeal cases not operated upon. Surely, if it does nothing else the serum saves at least double the number of cases of laryngeal diphtheria that has been saved by any other method of treatment.

The great preponderance of intubation over tracheotomy operations shows how much more highly the profession in this country esteems the former operation.

A STUDY OF THE FATAL CASES.

Of the 450 fatal cases in the committee's report, 229, or one-half, received their first injection of the serum on or after the fourth day of the disease, and 152, or over one-third of these, on or after the fifth day.

There were fifty-eight cases in which it was stated that the child was moribund at the time of injection, the serum being administered without the slightest expectation of benefit, but at the earnest solicitation of the parents.

There remain 350 cases in which the cause of death could be pretty accurately determined by the reports. These died from the following causes, the most important cause being placed first.

Sepsis (including diphtheritic toxemia) was the cause of death in 105 cases, of which sixteen had nephritis, four were intubated or tracheotomized, two were laryngeal cases not operated upon, four had paralysis, one had pneumonia, and in one the fatal sepsis was attributed to a traumatic condition of the left knee.

Cardiac paralysis was the cause of death in fifty-three cases. Under this head are included cases of sudden heart failure occurring at the height of the disease (twenty-one in number) as well as those more commonly designated as heart paralysis, where death occurred suddenly after the throat cleared off. Of the latter there were thirty-two examples; four of these had paralysis, nineteen were septic, eight had

nephirtis, five were intubated, and one tracheotomized.

Broncho-pneumonia was put down as the cause of death in fifty-four cases. In thirty-seven of these it followed laryngeal diphtheria; of these twenty-two were intubated, and four tracheotomized; two had nephritis; nine were septic. Broncho-pneumonia and sepsis was the cause of death in ten cases, of which three had nephritis and one general paralysis. Broncho-pneumonia caused death in seven cases, apart from sepsis or laryngeal diphtheria; of these only one had nephritis; one died from heart failure; and in five, pneumonia came on late in the disease.

Laryngeal diphtheria without operation caused death in forty-eight cases. In some of these the operation was refused by the parents, in others it was neglected by the physician, the patients dying of asphyxia; three of these cases had nephritis, four were septic, two had pneumonia, and one had sepsis and nephritis.

Diphtheritic tracheitis or bronchitis caused death in eleven cases; all of these were intubated, and in two there was evidence of the existence of membrane in the bronchi before operation. There were thirty-three other cases in which death followed laryngeal diphtheria without the supervention of pneumonia. It is highly probable that in some of these death was due to membranous tracheitis or bronchitis. All of them were operated upon; ten were septic, two had paralysis, and one had nephritis.

Sudden obstruction of the intubation tube was the cause of death in three other laryngeal cases.

The tube was coughed up in three cases, fatal asphyxia occurring before the physician could be summoned.

Died on the table during tracheotomy, one case.

Nephritis was the cause of death in fifteen cases; seven of these were septic, and three had been intubated.

General paralysis was the cause of death in five cases; in all probably the pneumogastric was involved.

Paralysis of the respiratory muscles produced death in one case, one of laryngeal diphtheria, which was intubated, was complicated by broncho-pneumonia.

Measles associated with diphtheria produced death in six cases; five of these were laryngeal and were intubated, in two there was pneumonia, and in two sepsis. Diphtheria developed during the height of measles, or immediately followed it.

Scarlet fever with diphtheria was the cause of death in six cases; in three of these there was broncho-pneumonia, nephritis and sepsis; in two scarlet fever preceded diphtheria, and in one of these there was sepsis with gangrene of the tonsils. In the sixth case the patient died of scarlet fever, which developed during convalescence from the diphtheria.

Gangrene of the cervical glands or cellular tissue of the neck was the cause of death in two cases associated with profound general sepsis.

Endocarditis caused death in one case, nineteen days after the diphtheria.

Diphtheritic inflammation of the tracheal wound with sepsis caused death in one case.

General tuberculosis, five weeks after diphtheria, was assigned as the cause of death in one case.

Exhaustion was the cause of death in three cases, one a protracted case; another complicated by pneumonia and sepsis; one by nephritis.

Convulsions was the cause of death in three cases apart from disease of the kidneys. In one, the well-known Brooklyn case, the girl died ten minutes after the injection, in another, twenty-four hours after injection, in the third the particulars were not given.

Meningitis was assigned as the cause of death in one case.

THE KIND OF ANTITOXIN USED.

They are given in the order of frequency with which they have been used: 1, the serum prepared by the New York Board of Health; 2, Behring's; 3, Gibier's;[2] 4, Mulford's; 5, Aronson's; 6, Roux's. In addition a large number of cases are reported as having been treated by the serum prepared by the Health Boards of different cities—Brooklyn, Newark, Rochester, Pittsburg, etc. The largest number of cases have been treated by the serum prepared by the New York Health Board, a very large number by Behring's serum, all others being relatively in small numbers.

Dosage and number of injections. In the great majority of cases but one injection is reported. In very severe ones two and three have been given. The largest amount is in a case by Wiener (Chicago) who gave eighteen injections of Behring's serum to a laryngeal case in a child thirteen years old. Another instance of ten injections is reported with no unfavorable symptoms.

As a rule the dosage has been smaller in antitoxin units than is now considered advisable, particularly in many of the laryngeal cases and others injected later than the second day.

CASES INJECTED REASONABLY EARLY (DURING THE FIRST THREE DAYS) IN WHICH ANTITOXIN IS SAID TO HAVE PRODUCED NO EFFECT, THE DISEASE ENDING FATALLY.

These cases are twenty in number. Brief reports are introduced that the reader may judge to what degree they may be regarded as a test of the serum treatment. In our statistical tables all of them have been included among the fatal cases.

In *Cases 1* and *2*, the cultures were reported negative. *Case 1*, by Gallagher, New York: Child eighteen months old; septic; although no eruption was present, the reporter was "inclined on reflection to regard this case as one of scarlatinal sore throat."

Case 2, by Potter, Buffalo: Male, fourteen months old; two cultures made, but no Löffler bacilli found; membrane in the nose and pharynx. Injected on the third day one dose of Behring's serum No. 1. No improvement; death from sepsis. "Probably pseudo-diphtheria" (I. H. P.).

In *Cases 3* to *9*, no cultures were made.

Case 3, by Tefft, New Rochelle: Seven years old; injected after eighteen hours' illness; two injections of Behring's No. 2 serum; membrane on the tonsils, pharynx and nose; no effect observed from injections, patient dying on the third day.

Case 4, by Tefft: Male, four years old; membrane on the tonsils and pharynx; injected after thirty-six hours' illness with Behring's No. 2; died on the third day; no noticeable effect from the injection.

Case 5, by Tefft: Six years old; membrane on the tonsils, nose and pharynx; septic; injected after thirty-six hours' illness; three injections of Behring's No. 2. "Saw no effect from the injections, the disease going steadily on to a fatal termination."

Case 6, by Cameron, Montreal: Two and a half years old; fifty hours ill; membrane on the tonsils, nose and pharynx; septic; no improvement noticed, and child died twenty hours after injection.

Case 7, by Baker, Newtonville, Mass.: Three years old; laryngeal diphtheria; injected on the third day 10 c.c. Roux's

[2] It is worthy of note that in the tests made by the State Board of Health of Massachusetts, published under date of April 6, 1896, this serum was found far below the standard as labeled upon the bottle; thus, a package marked to contain 2,500 units, by test was found to contain less than 700. All the other varieties of serum tested were found essentially up to the standard.

serum; cyanosis; intubation; temperature 103 degrees F., and continued high until death in eighteen hours after operation; injections had no effect.

Case 8, by Anderson, New York: Three years old; injected after three hours' illness; membrane on the tonsils, nose and pharynx; one injection New York Health Board antitoxin. "A case of malignant diphtheria, full duration twenty-four hours."

Case 9, by McLain, Washington: Four years old; twelve hours sick; membrane on the pharynx and the larynx; two injections; no operation; first injection early in the morning, the other early in the afternoon; died the same day; no change in the condition; antitoxin had no apparent effect.

In cases 10 to 13 diphtheria complicated measles, all reported by W. T. Alexander, New York. Disease confined to the larynx in all; in three the stenosis developed during measles, and in one while the patient was convalescing from measles; diagnosis confirmed by culture in every case, and in all intubation performed. Antitoxin seemed to have no effect, the cases going on to a fatal termination; all received their injections within twenty-four hours after the laryngeal symptoms appeared.

In three cases—14 to 16—the type of the disease was malignant from the outset.

Case 14, by Lloyd, Philadelphia: Fifteen months old; injected after thirty-six hours' illness; diagnosis confirmed by culture; membrane covered the tonsils, pharynx, nose and larynx; intubation; sepsis; death on the fifth day. Although antitoxin was used as promptly as possible no perceptible effect noticed. One injection, Behring's No. 3, was given.

Case 15, by Wert, Mount Vernon, N. Y.: Eighteen months old; injected on the third day; diagnosis confirmed by culture; membrane on the tonsils and pharynx. "Very intense type of the disease." Antitoxin could not be procured before the third day; Gibier's serum used. "Died suddenly in apparent convulsions about ten hours after injection; urine not examined; very little passed."

Case 16, by Ingraham: Six years old; membrane covered the tonsils, pharynx, and larynx; diagnosis confirmed by culture; pneumonia present; condition very bad; injected after two and a half days' illness; three injections of Behring's serum; no benefit noticed.

Case 17, by Johnson, Buffalo: Three years old; twelve hours ill; case septic from the start; membrane on the tonsils, pharynx, and larynx; diagnosis confirmed by culture. "Antitoxin apparently had very little effect."

Case 18, by Baker, Newtonville, Mass.: Two and a half years old; twenty hours ill; disease confined to larynx; diagnosis confirmed by culture; one injection of Gibier's serum; intubation. "Was doing well a few minutes before death when child got up in its crib, changed color and died almost immediately." Death attributed to "sudden heart failure; found no obstruction of the tube."

Case 19, by Story, Washington: Five years old; in fair condition; thirty-six hours ill; diagnosis confirmed by culture; membrane on the tonsils, pharynx, and larynx; one injection of United States Marine Hospital antitoxin; injection produced no effect.

CASES IN WHICH UNFAVORABLE SYMPTOMS WERE, MIGHT HAVE BEEN, OR WERE BELIEVED TO HAVE BEEN, DUE TO ANTITOXIN INJECTIONS.

Only three cases reported to the committee could by any possibility be placed in this category. All of the details furnished by the reporters are reproduced:

Case 1, by Kortright, Brooklyn: Sudden death in convulsions ten minutes after injection. This case is the already well-known Valentine case, occurring in Brooklyn in the spring of 1895. The principal points were as follows: A girl sixteen years old; in good condition; tonsillar diphtheria; diagnosis confirmed by culture; injected on the first day with 10 c.c. Behring's serum; died in convulsions ten minutes later.

Case 2, by Kerley, New York: Fairly healthy boy, two and one-half years old; membrane on tonsils, pharynx and in nose. Diagnosis confirmed by culture; injected on the morning of the fourth day with 10 c.c. (1,000 units) New York Health Board serum; temperature at time of injection 100.4 degrees F.; no sepsis, and child apparently not very sick; urine free from albumin. Distinctly worse after injection; in ten hours temperature rose to 103 degrees F.; urine albuminous; throat cleared off rapidly, but marked prostration and great anemia, with irregular fluctuating temperature continued and death from exhaustion with heart failure four days after the use of the serum.

Case 3, by Eynon, New York: Male, three and one-half years old; diagnosis confirmed by culture; two days ill; membrane on tonsils and in nose; two injections New York Health Board serum. "A rapid nephritis developed after the second injection, causing coma, convulsions and death twenty hours after the second injection." In response to an inquiry for further particulars the following was received: "The case seemed a mild one, but the injection was given one afternoon and repeated the following afternoon, about 1,500 units in all. The urine up to that time had not been examined. About fourteen or sixteen hours after the second injection unfavorable symptoms began to develop pointing to infection of the kidneys. The urine was found to be loaded with albumin. My impression at the time was that the antitoxin either produced, hastened or intensified nephritis, thereby causing the fatal termination."

In regard to the three fatal cases just cited, Case 1 is wholly unexplained. In Case 2 the query arises, did this sudden change hinge upon the injection of the serum or was it one of those unexplained abrupt changes for the worse in a case apparently progressing favorably, so often observed in diphtheria? As regards Case 3, it will be seen from the letter that the evidence is not at all conclusive. All details available are given and the reader may draw his own conclusions.

CLINICAL COMMENTS.

The following are selected from hundreds which have been received and may be taken fairly to represent the sentiments of the physicians who have sent in reports:

Dr. Douglas H. Stewart, New York, sends reports of four cases, all desperate ones, and all "presumably fatal under any other form of treatment." Very extensive membrane in all; larynx involved in three; in one neglected case in a child 3 years old, *injected upon the fifth day*, the membrane covered the tonsils, nose, pharynx and larynx. Broncho-pneumonia, nephritis and sepsis all present. Temperature 107 degrees F. at the time of the first injection. Prostration so great that he dared not attempt intubation. Believes that this case would certainly have been fatal in a few hours without antitoxin. Perfect recovery.

In another case 3 years old, membrane first discovered in the left ear, next morning seen upon the tonsils, and spread in a few hours over the pharynx into the larynx and trachea. Intubation necessary in a few hours; had never seen membrane spread so rapidly as in this child. Urine albuminous; membrane subsequently expelled from larynx and trachea in large casts with profuse bloody expectoration. Complete recovery on the ninth day. The physician describes this as "the very worst case of diphtheria that has ever come under my notice." Five thousand four hundred antitoxin units were given in four injections. He remarks: "My experiences in the past have been so very unfortunate that the advocates of antiseptics or therapeusis were a constant surprise to me. It has been my fate to have the most desperate cases unloaded upon my shoulders. I had been forced into the belief that the profession was absolutely powerless in the presence of true diphtheria; have lost case after case with tube in the larynx and calomel fumigations at work. Previous to antitoxin my only hope had become centered in nature and stimulants. In two years have not lost a single case, and surely I may be pardoned if I suffer from diphtheria-phobia in a sub-acute form, and use antitoxin sometimes unnecessarily."

Dr. L. L. Danforth, New York, states that during his twenty-two years of practice in New York he has

seen many fatal cases of diphtheria, had used all kinds of remedies, mainly those of the homeopathic school, and while he had as much confidence in the latter as in anything else, he had seen so many deaths during the year past that he "hailed with delight the advent of antitoxin and determined to use it." Reports five cases, all of a severe type. "The result in every case has been marvelous. I would not dare to treat a case now without antitoxin."

Dr. H. W. Berg, New York, reporting fourteen cases, says: "I have not yet ceased to be surprised at the recovery of some of these cases, which, in the light of my former experience with diphtheria treated without antitoxin, seemed to be irretrievably lost."

Dr. George McNaughton, Brooklyn, reports seventy-two laryngeal cases, with twenty-four deaths; sixty-seven of these were intubated, with twenty-one deaths. He states that he has kept no records of cases other than laryngeal ones, as these seemed the best test of the serum treatment. He believes that if the serum is used early, very many cases will not need operation for the relief of stenosis. "I would urge the use of antitoxin in all cases of croup in any patient who has an exudation upon the pharynx; would not wait for bacteriologic confirmation of diagnosis, for in so doing valuable time is lost." Has noticed that the tube is coughed up more frequently in injected cases, and believe this due to the fact that the swelling of the tissues subsides at an early date.

Dr. D. C. Moriarta, Saratoga, reporting four cases, says that the first was a malignant one and "I only used the remedy because I am Health Officer and was urged to do so, as the type of the disease was that from which I have seen recovery but once in eleven years." Boy 5 years old, four days ill when injected; great prostration, rapid breathing, and he was "practically gone." Nares filled and tonsils and pharynx covered; severe nasal hemorrhage; cervical glands greatly swollen; heart's action very frequent and feeble; child unable to lie down. Behring's serum twenty c.c. injected; in six hours evidently more comfortable; in eighteen hours decidedly improved; in twenty-four hours sitting up and feeling much better; in forty-eight hours all urgent symptoms gone and membrane loosening. Subsequently had nephritis which lasted six weeks, and multiple neuritis which persisted for three months, but ultimately recovered perfectly. "I send this report because it converted me. No unbiased person familiar with diphtheria could see such results as this and not feel there must be good in it."

Dr. F. M. Crandall, New York, sends report of a child 7 years old. Membrane on the tonsils and in larynx, with croup for forty hours when antitoxin was injected and intubation done. Progress of the disease had been rapid; semi-stupor and eyes half open; very feeble, rapid pulse; intense toxemia; general cyanosis. Both cyanosis and dyspnea persisted after intubation, showing clearly the presence of membrane below the tube. Case regarded as "absolutely hopeless." The first change was seen in the disappearance of toxemia, with improvement in the pulse, clearness of the mind, etc.; later a change in the local condition; large masses of membrane were expelled from the larynx and trachea, necessitating frequent removals of the tube. Tube finally removed in a week with complete recovery.

Dr. Reynolds, Baltimore, mentions a case showing the danger of relying too implicitly upon the bacteriologic diagnosis. Male, 3 years. Culture reported only staphylococcus and streptococcus, consequently injection delayed until the fifth day, when membrane covered tonsils, nose and pharynx. Child died two days later. A sister subsequently contracted the disease, received antitoxin on the third day and recovered. The reporter would not wholly rely upon the culture test for diagnosis.

SUMMARY.

1. The report includes returns from 615 physicians. Of this number more than 600 have pronounced themselves as strongly in favor of the serum treatment, the great majority being enthusiastic in its advocacy.

2. The cases included have been drawn from localities widely separated from each other, so that any peculiarity of local conditions to which might be ascribed the favorable reports must be excluded.

3. The report includes the record of every case returned except those in which the evidence of diphtheria was clearly questionable. It will be noted that doubtful cases which recovered have been excluded, while doubtful cases which were fatal have been included.

4. No new cases of sudden death immediately after injection have been returned.

5. The number of cases injected reasonably early in which the serum appeared not to influence the progress of the disease was but nineteen, these being made up of nine cases of somewhat doubtful diagnosis; four cases of diphtheria complicating measles, and three malignant cases in which the progress was so rapid that the cases had passed beyond any reasonable prospect of recovery before the serum was used. In two of these the serum was of uncertain strength and of doubtful value.

6. The number of cases in which the patients appeared to have been made worse by serum were three, and among these there is only one new case in which the result may fairly be attributed to the injection.

7. The general mortality in the 5,794 cases reported was 12.3 per cent.; excluding the cases moribund at the time of injection or dying within twenty-four hours, it was 8.8 per cent.

8. The most striking improvement was seen in the cases injected during the first three days. Of 4,120 such cases the mortality was 7.3 per cent.; excluding cases moribund at the time of the injection or dying within twenty-four hours, it was 4.8 per cent.

9. The mortality of 1,448 cases injected on or after the fourth day was 27 per cent.

10. The most convincing argument, and to the minds of the Committee an absolutely unanswerable one, in favor of serum therapy is found in the results obtained in the 1,256 laryngeal cases (membranous croup). In one-half of these recovery took place without operation, in a large proportion of which the symptoms of stenosis were severe. Of the 533 cases in which intubation was performed the mortality was 25.9 per cent., or less than half as great as has ever been reported by any other method of treatment.

11. The proportion of cases of broncho-pneumonia —5.9 per cent.—is very small and in striking contrast to results published from hospital sources.

12. As against the two or three instances in which the serum is believed to have acted unfavorably upon the heart, might be cited a large number in which

there was a distinct improvement in the heart's action after the serum was injected.

13. There is very little, if any, evidence to show that nephritis was caused in any case by the injection of serum. The number of cases of genuine nephritis is remarkably small, the deaths from that source numbering but fifteen.

14. The effect of the serum on the nervous system is less marked than upon any other part of the body; paralytic sequelæ being recorded in 9.7 per cent. of the cases, the reports going to show that the protection afforded by the serum is not great unless injections are made very early.

The Committee feels that this has been such a responsible task that it has thought best to state the principle which has guided it in making up the returns. While it has endeavored to present the favorable results with judicial fairness, it has also tried to give equal or even greater prominence to cases unfavorable to antitoxin.

In conclusion the Committee desires in behalf of the Society to express its thanks to members of the profession who have coöperated so actively in this investigation, and to Dr. A. R. Guerard for the preparation of the statistical tables.

(Signed)

L. Emmett Holt, M.D.,
W. P. Northrup, M.D.,
Joseph O'Dwyer, M.D.,
Samuel S. Adams, M.D.,
} Committee.

THE ACTION OF THE SOCIETY UPON THE REPORT.

At the close of its presentation, the Society voted to accept the report of the Committee and after a full discussion it was decided to embody its conclusions in the following resolutions:

(1) *Dosage.* For a child over two years old, the dosage of antitoxin should be in all laryngeal cases with stenosis, and in all other severe cases, 1,500 to 2,000 units for the first injection, to be repeated in from eighteen to twenty-four hours if there is no improvement; a third dose after a similar interval if necessary. For severe cases in children under two years, and for mild cases over that age the initial dose should be 1,000 units, to be repeated as above if necessary; a second dose is not usually required. The dosage should always be estimated in antitoxin units and not of the amount of serum.

(2) *Quality of antitoxin.* The most concentrated strength of an absolutely reliable preparation.

(3) *Time of administration.* Antitoxin should be administered as early as possible on a clinical diagnosis, not waiting for a bacteriological culture. However late the first observation is made, an injection should be given unless the progress of the case is favorable and satisfactory.

The Committee was appointed to continue its work for another year and was requested to issue another circular asking for the further coöperation of the profession, this circular to be sent out as soon as possible in order that physicians may record their cases as they occur through the coming year.

Formalin in Gonorrhea.—Dr. George T. Howland reports five cases of gonorrhea treated with one half per cent. formalin solution. By means of Sterns urethral irrigators, one quart of the warm solution was injected once or twice a day. The discharge ceased in from twelve to twenty-seven days.—*Journal of Cutaneous and Genito-Urinary Diseases*, June, 1896.

THE RELATIONS EXISTING BETWEEN OCULISTS AND OPTICIANS.

Read before the Tri-State Medical Society, at Chicago, April 8, 1896

BY FRANK ALLPORT, M.D.

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MINNEAPOLIS, MINN.

In presenting this paper before your society, I am impressed with the advisability of an oculist laying before a body of influential general practitioners one of the evils of ophthalmology. It is unnecessary to argue this matter in an ophthalmological society or section, as *we* clearly appreciate and understand the argument. But it is desirable that our common friend and mother, the general school of medicine and surgery, should listen to our views, and render us that aid and cordial coöperation we so earnestly and righteously desire, and feel we have a right to expect and and demand. Many of you, practicing in more general lines of work or separating yourselves into other special fields, do not thoroughly understand and appreciate the importance and gravity of the situation, and often, I fear, nay, I am sure, lend your influence by indifference or positive advice, to the perpetuation and prosperity of an evil striking at the root of essential ophthalmological development. I refer to the alleged correction of errors of refraction by the numerous varieties of opticians.

In discussing this question, no claim of originality is made, for the ground has been quite thoroughly covered by Dr. Pilgrim and others; therefore, what I have to say must appear largely in the light of repetition; I simply desire to awaken in the minds of physicians *not* practicing ophthalmology an interest in the matter similar to that experienced by them (in which they expect us to participate), upon witnessing unqualified and unlicensed men, in the shape of itinerants, residents, or druggists, presuming to boldly practice medicine or surgery. In writing this paper, I am well aware that to little souls, in and out of the profession, it may appear as a narrow and selfish complaint, originating from a diminished income, on my own part and that of my brother oculists. To broad-minded men, however, an entirely different construction will be placed upon my words, and my reasoning will be clear, and understood as an effort to prevent the practice of medicine by improper persons, and to protect the public, by improving the status of our profession. Such reform work has been accomplished in other branches of our science; it should, and will be done in this. With regard to such practices diminishing the incomes of oculists, it is my firm and honest conviction, after years of experience, that this is not the case. Those who primarily patronize the optician, would not usually seek an oculist, and do not except under compulsion, sometimes induced from sad and unfortunate ocular experiences in an optical establishment.

Dr. Gould says, "Every pair of lenses worn by every person in the world has a medical and pathological significance." If this remark is true, and it undoubtedly is, the adjustment of glasses should only be confided to men who have not only some knowledge of optics, etc., but who also possess a broad conception of the anatomy, physiology and pathology of the human body, including the eye. If *properly* adjusted glasses are capable of improving the eye and health, and relieving ocular symptoms and various

reflex neuroses, *improperly* adjusted glasses are capable of *producing* the same pathologic conditions. The average oculist can enumerate scores of instances where this has occurred, by the prescribing of concave for convex glasses, the over-correction of myopia, the improper setting of cylinders and prisms, etc.; but such facts are not so well understood by the general practitioner, and it is hoped that the honest assurance by honest oculists that such instances are of more than frequent occurrence will lead to an establishment of the truth.

Who is the optician? He has a plural existence, the lowest grade of which can be found at the county fair or the street corner. These men, as a rule, do not pretend to much knowledge, and may content themselves with selling their wares, and perhaps aiding their patrons with a few lines of printed matter to select glasses. That they are harmful is certain, but inasmuch as the customer simply purchases whatever glasses he may select, it may be correctly asserted that the circumstance is similar to the sale of a designated variety of patent medicine, and until we can control the sale of the latter, we can not justly demand the abolishment of the former, although the technical argument might be raised, that one is patented and protected by the government and the other is not.

The jeweler or druggist who sells glasses, under practically the same circumstances, with little or no protestation of knowledge, and no tendering of advice, places himself in the same category, an undoubted evil, but nondescript in character and difficult to control. The next grade of optician is he who travels from town to town, announcing himself as Doctor or Professor So-and-So, carrying with him a formidable array of poorly understood instruments, and much seductive literature. He may have "picked up" his fund of knowledge in some optical establishment, or "graduated" at some "Refraction" or "Optical School," whose existence should be at once condemned. His methods of doing business are various and astonishing, but will not be here criticised, as such criticisms are not the aim and object of this paper, which is written for a broader purpose. Suffice it to say that the traveling optician usually does a good and profitable business, and often forms pleasant acquaintances with physicians in small towns, who, it must be regretfully admitted, send them patients who are supposed to need glasses.

Another variety is he who "holds forth" at a department store, or in some room or store of his own, or forms an alliance with a jeweler. He belongs to about the same class as the traveling optician, except that he does not travel, and these two classes have at least one thing in their favor, viz., they do an independent business, and ask no favors of the oculist in the way of prescription work, which can not be said of the highest grade of optician, viz., he who has a store and workshop in a large city, does prescription work for oculists, and all the refraction work he can do besides. He is the evolution of the original optician from whom has sprung all the preceding varieties just mentioned, and consequently the "principal offender" in the present issue. Now permit me to say on the start, that I have no quarrel with opticians as a class; I know many of them personally and take pleasure in testifying to their average honor and integrity. The better class of opticians realize the embarrassments and perplexities of the subject keenly, and would gladly do all in their power toward its rectification; but they are rendered powerless by unprincipled competitors, who are unwilling or unable to see the difference between an oculist and an optician, and who either considers that a superficial knowledge of optics fully equips them to intelligently treat refraction errors, or who know better, but persist in their course in spite of their knowledge. It is chiefly such opticians who come in contact with the oculist, for it is to such shops that his prescriptions are usually sent. This places him in the unfortunate and anomalous position of directing his business to his principle, and not always honorable competitor, which frequently leads to a disintegration of confidence between the oculist and his patient, and an impertinent and presumptious alteration of a prescription by the optician from time to time to suit the emergencies of the case.

Owing to these and many other abuses, a lack of harmonious relations have necessarily crept in between the oculist and optician, the former feeling that an ocular examination and refractive correction is not a mere mechanical art, but one of the highest and most exacting branches of medical science, and to be dealt with by properly educated physicians only, and the latter, *perhaps*, feeling that he is as competent to "fit glasses" as the oculist, and should consequently be allowed to do so unmolested, and that everybody should strictly "mind his own business." It is strangely true, however, that the optician feels aggrieved when the oculist, in view of the fact that the optician is his active competitor, endeavors to ignore the latter by dispensing his own glasses. There is also a higher motive in such a step, viz., a conviction that he who practices medicine without a license should be discouraged. The optician should remember, that as long as he even *reasonably* adhered to his trade, amicable relations existed between himself and his best friend and patron, the oculist, and not until he endeavored to usurp the latter's position, and inaugurated a series of mutually unfortunate consequences, has the oculist been compelled to resort to measures that the optician views with mingled feelings of hatred and revenge. He has built his own house and should be willing to live in it.

The measures of relief adopted by many oculists, such as purchasing their own glasses, engaging a private office optician, etc., are not as yet wholly desirable, but no one can doubt the evolution of a plan satisfactory to both oculist and patient. Let us hope that the ultimate solution will be the re-establishment of amicable and mutually profitable relations between the oculist and optician, and the determination by the one to adhere to his profession and the other to his trade, and together exterminate pretenders, who are neither one thing nor the other.

In order that errors of refraction may be accurately corrected, it is necessary that the work of both oculist and optician should be properly performed; both are dependent upon each other, and should labor together for their mutual benefit and the good of the public. The optician possesses a high and honorable calling and one of which he need not be ashamed. Why then should he seek to invade the territory of the practice of medicine? The lame and senseless argument is sometimes advanced, that the optician antedates the oculist, who has therefore become the trespasser. The barber might as well claim a right to practice surgery and dentistry, as history places him in the pioneer ranks of both these professions. The

truth of the matter is, that correcting errors of refraction has developed, by inevitable scientific solution, from a mere trade to an important branch of medicine and surgery, and as such should be performed only by properly educated men. If the optician wishes to do such work, he should study medicine and become a licensed physician, when he will be privileged to practice his profession in this or any other line he may select.

I would not be understood as meaning that a medical diploma is an assurance of knowledge, as the occupation of a chair in a medical college for fifteen years, has compelled me to regretfully express an adverse opinion. I am willing to admit that the most intelligent resident opticians possesses a better knowledge of optics and errors of refraction than the average medical man. But two wrongs do not make a right, and no one unpossessed of a medical license should perform such work, and only then when special ophthalmologic training has supplemented a general medical education. I am happy to say that ever-increasing salutary medical laws, combined with efficient postgraduate instruction, have rendered the special practice of ophthalmology untempting to most men not thoroughly equipped for its prosecution. The field would be broadened and deepened, the public benefited, and small towns quite generally supplied with physicians well qualified to work in this department, if only the optician in his various aspects could be prevented from attempting to correct errors of refraction.

The law, as at present interpreted, does not require that an optician shall possess any knowledge whatever in order to follow his important and dangerous calling. A druggist is subject to pharmaceutic laws, a veterinary surgeon to veterinary laws, a dentist to dental laws, but an optician is subject to no laws whatever, and may continue adjusting glasses, and ruining eyes at his own option. One would think that the better class of opticians would take sufficient pride in their own business, profession, or whatever they choose to call it, to precipitate some thoughtful legislation tending toward a purification of their own ranks. It is hoped that the agitation of this question will at least accomplish some result, for a proper eliminating process will leave broader-minded and better educated men to deal with, and it is unquestionably true, that the more intelligent the optician, the more does he comprehend the position of his calling, and the more ready is he to exalt its importance, to distinguish and admit the difference between an oculist and an optician, and to govern his actions accordingly. I am loath to admit that there are many physicians of more than average ability who, either by word or deed, sympathize with the optician in this argument, and do not admit that in attempting to correct errors of refraction the optician is essaying the practice of medicine. Such views are born either of indifference or an ignorant misconception of the facts, and should be easily overcome by the exercise of reason, intelligence and thought. No special field of our profession has made greater advances of late years than ophthalmology, and the most distinguished of its devotees unite in declaring errors of refraction and muscular anomalies its most profound and scientific subject, and one that has taxed without satisfying many of the most powerful intellects of the century. These men declare unhesitatingly that such work can not be separated from general ophthalmology, and surely no one believes that the latter can be alienated from the practice of medicine.

No intelligent oculist to-day fails to thoroughly examine every patient who seeks his advice, even if only the correction of presbyopia is the object of the visit. Such an examination includes a general review of the physical condition of the patient, and an exacting and systematic investigation of the eye, both intra- and extra-ocularly, not only as to the refraction and muscular balance, but also as to medial opacities, cataract, retinal, chloroidal and nerve diseases, and many other pathologic conditions impossible of detection by the inexperienced, and yet frequently of the greatest importance to the applicant when once discovered. It often happens that cases of supposed rapidly advancing presbyopia prove upon careful examination to be glaucoma, amenable to treatment and possible of cure. Diminution of vision is sometimes proven by the ophthalmoscope to be the first evidence of ulbuminuria in the retina, which serves as an indication for successful therapeusis. Headaches, neuralgias, etc., are daily discovered to be the reflex evidences of hypermetropia, astigmatism, muscular insufficiencies, etc. And so I might proceed in giving instance after instance explaining *why* ocular examinations should be made as frequently as possible and by properly equipped physicians only, but I refrain, as it appears almost an insult to intelligent physicians to urge the claim after once their attention has been diverted in this direction.

Without further specification, then, which I am confident is totally unnecessary, I make the statement boldly, and without fear of contradiction by those having sufficient intellect to judge or breadth of character to concede, that correcting refractive errors is practicing ophthalmology, which, in its turn, is practising medicine, and that this should be permitted only by medical graduates, and that where State medical practice acts exist, the optician is practicing medicine without a license, and should be restrained from further prosecuting his calling, so far as giving advice and prescribing glasses is concerned. Such work can not be properly performed without a thorough knowledge of anatomy, physiology, pathology, etc., a broad training in ophthalmology and a general comprehension of the different branches of the science of medicine and surgery, as taught in first-class medical colleges and postgraduate institutions.

In presenting this paper I have refrained from casting slurs upon the optician, and from indulging in any personalities or instances whatever; they have pressed in upon my memory, with their aptness and appropriateness, so urgently as to render their repression exceedingly difficult, but I have felt that what was needed was not a display of acrimonious bitterness, inspired by personal quarrels and a sense of wrongdoing and injustice, but a calm, earnest, and unimpassioned presentation of the point at issue, viz., the unlicensed practice of the medical profession by my friend the optician. There is no more reason why an optician should fit glasses, than that a druggist should prescribe medicine, and yet you, my brother general practitioner, would anticipate *our* aid in expelling such an evil, and would not expect us to ask you the reason why. Let us, I beg of you, bespeak *your* assistance in sentiment, influence and action.

What is to be done about it? This is a serious question, and one surrounded with obstacles. Great movements progress slowly, and we can not anticipate

a satisfactory settlement at once. We must primarily awaken a proper comprehension of the subject in the minds of physicians, and through them compel the laity to understand, that "fitting glasses" is not a trifling affair, necessitating only the patient's personal sensations, and the guidance of an optician to correctly consummate; but that it is, on the contrary, an important event, necessitating a thorough examination and possibly entailing serious consequences, and should therefore only be performed by a properly equipped, especially trained, medical practitioner. Until this is reasonably well accomplished, it will be futile to attempt more radical measures. Let this step be well grounded by constant agitation, and a desirable solution of this perplexing question will be rendered comparatively easy.

SOCIETY PROCEEDINGS

New Jersey State Medical Society.

Proceedings of the 130th Annual Session held in Asbury Park, June 23, 1896.

The usual reports, etc., were presented and acted upon. The committee on the prevention of purulent infection of the eyes of the new born reported that the Board of Health had issued a circular to the profession, etc., detailing the plan of Credé of Leipzig, to prevent this. After the umbilical cord has been divided and the skin cleansed, bathe the eyelids with a cloth wet with pure water, then touch the everted lids with a glass rod dipped into a 2 per cent. solution of nitrate of silver. It was agreed that the State Board of Examiners should be asked to require of each applicant for a license to have a knowledge of this method.

The proposed act to prevent cruelty to animals in the District of Columbia was brought up by Dr. H. Mitchell, the secretary of the State Board of Health and after some discussion it was

Resolved, That it is the sense of this Society that the bill entitled a "bill for the further prevention of cruelty to animals in the District of Columbia" now pending before Congress is a menace to medical and surgical progress, a bar to proper scientific investigation and inhumane in that it restricts the possibility of the acquirement of knowledge that will lessen human suffering and prolong life; therefore,

Resolved, That the Medical Society of New Jersey respectfully requests the members of Congress from this State to use every proper effort to prevent it from becoming a law.

Resolved, That printed copies of this action be forwarded to the New Jersey congressmen and to the chairmen of the committees on the District of Columbia in the Senate and House of Representatives of the United States.

In the afternoon the Standing Committee gave a very valuable resume of the reports of the counties of the epidemics that had prevailed in their localities, the result of the trial of new remedies, of improved sanitation, especially of the results of the employment of antitoxin, mallein and thyroid extract. There was a great want of uniformity in the results as reported. Some appeared to have obtained very great benefit, others had found these remedies useless, while others held them sub judice.

DR. PHILIP MARVEL of Atlantic City, read a valuable paper upon

AUTO-INFECTION.

He explained the difference between ptomaines and toxins; the one poisonous, the other harmless. The toxins were the result of decomposition within the body. There is constantly going on a building up and breaking down; so long as the two processes are kept equal, the person is in health. Otherwise, disease results from the alkaloidal products. The channels by which the poisons are eliminated are the blood, lymphatics, the cellular tissue, etc. The putrefaction of foods result in a toxin formed by the action of the bacteria on the proteids. This is the principal cause of nearly all diseases. The common carriers are the blood and lymphatic systems. When the poison is in excess of the vital fluids, there is impaired function followed by death unless soon relieved. The poisonous substances are formed by the presence in the body of complex substances capable of combining with acids through the action of fermentative bacteria producing salts corresponding to organic and vegetable bases. All animal excretions are poisonous and are eliminated by the skin, the alimentary canal, the pulmonary mucous membrane and the skin. Acute auto-infection is very dangerous and gives rise to symptoms which are alarming, followed by death in a very short time. He quoted several cases where death had followed the ingestion of food already partially decomposed. Also quoted some experiments with animals where the injection of bile produced death in a short time. We must have free elimination constantly going on, or there will be reabsorption. Somewhere in the animal economy there is an unknown means for transforming toxic into inert matter or life could not continue. We find also that there is a different degree of poison for the same toxin in different individuals and under almost the same circumstances. Excess of food will often load the system with these toxins and we also find different types of these troubles. In acute cases we have a development of gas, tympanites, burning stomach, eructations, etc.; with these, headache, depression, fatigue, dizziness, vertigo, etc. In graver attacks there are convulsions, coma, death. These symptoms must be differentiated from ordinary impared digestion by the suddenness of the onset, within six to twenty hours after taking food. When we can obtain free emesis and relaxed bowels there is more possibility of relief. In some instances we have extensive skin eruptions resembling erythema, scarlatina and the like. Sometimes the absence of vomiting will mask the case. He mentioned cases where the diagnosis had been measles, etc. He carefully analyzed several cases which he detailed showing how to prove the origin. In nearly every case it is the result of food ingested which had already begun to decompose. Some of the results of this trouble may be chronic atony of the stomach, dyspepsia, diarrhea, dysentery, stomach cancer or dilated stomach. 1, we have disarrangement of the structural tissues; 2, consequent interference with the nerve energies; 3, impairment of cellular function, inviting abnormal production; 4, and thus favoring fermentation; 5, prolonging digestion, thus aiding putrefaction. Perhaps in the future we may be enabled to observe these actions by means of skiascopy. He believed that numbers of cases had been diagnosed typhoid fever and when treated by intestinal antisepsis and elimination had been established, got well in ten days or two or three weeks, and thus were quoted as aborted typhoid fever.

DR. G. H. BALLERAY gave the details of a number of cases of fibroids of the uterus obstructing labor, with subsequent disappearance of the tumor. He detailed the symptoms by which the presence of some obstruction was determined, the mode of procedure in delivery, turning, etc. The detail of cases was unique and interesting and elicited much animated discussion. It was agreed by those who participated that the tumors were not ovarian, nor in every case truly fibroids, as these rarely if ever disappear in this manner.

DR. HENRY MITCHELL, the secretary of the State Board of Health, introduced his aid, DR. M. RAVENEL, who gave a very able resume of what was proposed to be done by the bacteriologic department of the Board. It was mainly devoted to the investigation of tuberculosis and diphtheria as these would occupy a central position being most important. The early diagnosis of diphtheria was of great importance and it was only by a bacteriologic investigation that the diagnosis could be made. Then a secondary examination was needed in order to decide when the patient had ceased to be dangerous to others. There is no fixed time when these bacteria disappear

from the throat, even mild cases show them six weeks after the disappearance of the membrane. They often linger in the nose and so long as a nasal discharge continues, it is suspicious and investigation should be made. Cholera also is to be looked after although it is hoped that no such need may arise. The diagnosis here can be made in eighteen to twenty-two hours and in no other way. Water being almost invariably the source of the infection, all water must be examined. It is not possible to be positive as to typhoid fever bacteria in the present state of the science especially in a sample of water, for the time elasping between the infection and the desire for an investigation of a suspected supply is so long, three to six weeks, that many changes may occur; and then it must be remembered that the bacillus of typhoid is delicate, non-resistant, and temperature and nutrition are not favorable to it, and the common water plants are antagonistic to it. Also we have mechanical precipitation and the disinfection practiced so that there are too many factors entering into the matter. Again we have the constant presence of the colon bacillus and perhaps the formation of ammonia by this bacillus has much to do with this. Diseases of animals must occupy the attention as being of great importance, as in tuberculosis; here tuberculin is an infallible test. Anthrax does not often occur, but the department is prepared to make the diagnosis and this very easy. Glanders can only be diagnosed by the inoculation of animals. Hydrophobia is diagnosed by the injection of brain of the suspected animal rubbed up with sterile water and placed beneath the dura mater of a rabbit. This is the chief use of this animal to allay the fears of those bitten and to check the spread of newspaper hydrophobia. Water examinations are only made when for public use.

The President, Dr. Wm. Elmer of Trenton, then delivered the annual address. He dwelt upon the need of personal hygiene as it must become a matter of intelligent conviction among all classes. Those who occupy higher positions must help the lower, the wage earners in this point. The physician must work in this line regardless of self to spread the gospel of cleanliness of the person, the house, the surroundings. Thus to stamp out preventable diseases, which are an insult to an enlightened community.

The State and local boards may issue orders, but the people must join to prevent such, as it is a crime greater than many for which men are punished; the greater the nation, the greater the regard for a high grade of sanitation. Public hygiene is now a science, we have a right to demand pure air, pure water, pure soil. Add to these wholesome food and surroundings. The great misery comes not from numbers but from our imperfections and want of control of the conditions in which we live. Sewer waste and filth disease are concomitants in the crowded community, they are forced upon us. The great waste of life is among the children; fully one-half die before they reach the age of 5 years. Cholera infantum is the usual cause, produced by crowded homes, illy ventilated, with bad drainage, bad food and equally bad milk. We are glad to be able to chronicle a great improvement in the last year: not only the poor live better, but the training and education of the young are greatly improved. Munter's "plenty of sleep, milk and flannel" is old but good common sense. We now have physicians on the school boards, we have compulsory vaccination, we have demands for quarantine, and the Health Boards demand a quarantine of not less than forty days for smallpox, scarlet fever, measles and diphtheria. In some places the latter is not regarded safe to release from quarantine until an examination shows the absence of the bacteria. We must teach the young the rudiments of isolation and infection and the laws of living. We demand health of body as well as trained minds. Ventilation of the sick room air without draft needs the attention of the physician; also food well prepared, wholesome, nutritious, daintily served. Baths and sunlight, with cheerful demeanor and quiet manner are needed for the sick and to prevent getting sick. Another great demand is the filtration of water supplies for the cities. The Cincinnati process of sedimentation and sand filtration appears the best; each bed is independent and there are daily bacteriologic examinations of each. By those means typhoid fever will be greatly lessened. He quoted several cities as showing the value of these methods. The economic value of a life is, say $780 each, hence a death by typhoid fever is known as destroying that amount of wealth. He also alluded to consumption, its communicability, being the most prevalent disease and with the greatest mortality. It is conveyed by a microscopic parasite, found in the sputum dust. We must rely upon hygiene, not drugs, in this disease. There were many other subjects which demanded our attention, but time would not admit. Preventive, not curative, medicine is the great question of the day.

On the second day Dr. Alexander McAllister, of Camden, read a paper on the

THERAPY OF ANTITOXIN SERUM, NUCLEIN SOLUTION AND THYROID EXTRACTS.

Most of the paper was devoted to the first subject. He treated of the discovery of this method and alluded to the work of Roux, Yersin, Klebs, Koch, Löffler, etc. They prove that it is not the mere presence of the bacillus that gives rise to the disease, but the products of it, the ptomaines. Diphtheria is a toxemia and its toxin acts as a ferment, and when injected into living tissues, there results a certain albuminoid body, this isolated, and subjected to alcohol, produces a proto- and dextro-albumose. Rabbits injected with this exhibited the signs of diphtheria. It has also been reduced to a white amorphous powder. Then came the immunizing of animals, next the injecting the serum of blood rendered immune to certain bacteria into animals, thus immunizing them. This is to be carefully distinguished from the Jenner process for smallpox, Pasteur's for hydrophobia, which really produce a milder form of the disease. He described the method of producing antitoxin. The consensus of medical opinion tends to favor this treatment of diphtheria. Of course it has met with opposition. Too sanguine results are expected, a want of understanding of the discovery and its limitations, as where it is used and the patient dies of pneumonia or nephritis, and the prejudice against a new treatment. Since Jan. 4, 1895, he had treated forty-five cases of diphtheria with antitoxin, all of which recovered. Too much attention can not be given to the preservative used in protecting the serum. Carbolic acid is a toxic and dangerous remedy, highly irritating to the kidneys and urethral tracts, hence objectionable. Formalin would be the ideal preservative, except for the fact that it coagulates the serum after a time. Camphor is uncertain, feeble in power, and disguises the signs of decomposition, and putrefaction might be present and not be recognized. The best germicide and preservative is tricresol, a very feebly toxic agent, no irritating effect on the kidneys, and only feebly coagulates albumin. It is for these reasons that we are apt to have strikingly different effects of the different kinds of preparations. Since Jan. 4, 1895, he had treated forty-five cases with the serum; diagnosis confirmed by culture in all but eight. One died of laryngeal diphtheria. There were seventeen of laryngeal form, all recovered. In only five was it necessary to repeat the injection a second time, and a third time in one. Mulford's serum was used. Twenty c.c. were used at each injection. He believed the serum produced in this country was equal in value to that made abroad. No local reaction followed; there was a rise of temperature in some of one or two degrees, and pulse somewhat accelerated. In the mild cases improvement was noticd in ten hours, in others twenty-four to thirty-six hours; membrane changes in color and becomes detached. Had a small abscess in one. Erythema followed in the majority in eight to ten days after the injection; in one it persisted two weeks. Internal treatment was mistura bashami, strychnia, stimulants, locally hydrozone, boric acid solution, etc. Albumin was present in urine of the majority, clearing up as convalescence advanced. Post-paralysis occurred in all to a mild degree. Where paralysis occurs, the results are more favorable where the serum has been used. Only three died of the forty-five; one of heart paralysis, one complicated with abortion, one of sepsis. Beyond a doubt the mortality is lessened. It is not a specific, as vaccination for smallpox. It does not destroy the bacillus, only checks the course of the disease. The mere presence of the Klebs-Löffler bacillus in a case of sore throat does not constitute it diphtheria; it needs other symptoms, as fever, etc. Had immunized twenty-one cases,

two had afterward a mild attack of diphtheria. Immunization takes away the dread of the disease. In intubation the tubes can be removed sooner than without the serum. Pharyngeal cases may be doubtful evidence, but the results in laryngeal cases are conclusive. He quotes 5,794 cases in private practice with 713 deaths, a percentage of 12.3. Injected during the first three days 4,120, with 303 deaths. After the fourth day 1,448, mortality 27 per cent.; 1,256 laryngeal cases, 691 not operated on, 563 recovered, 80 died from other causes, and 48 from laryngeal stenosis; 565 operated on, mortality 25.9 per cent. Intubation in 533, tracheotomy in 32, mortality 37.4 per cent. Cases drawn from the practice of 615 physicians; over 600 express themselves strongly in favor of the serum. We regret that it is impossible to give more at length the details of this interesting and valuable paper. He gave a valuable bibliography, and statistics of American and foreign observers with and without the serum. There have been upward of a million injections and but five deaths were attributed to the serum, and in these no positive conviction can be assigned. With nuclein and thyroid extracts his experience was limited. The masters have given us reason to believe in these remedies, and he believed time would prove them correct. Many able clinicians are using nuclein locally and internally. The minimum dose to begin with is 10 minims, increasing 5 minims daily till the maximum dose is reached, 30 to 80 minims. In delicate or nervous patients you may have shock, fainting; here a stimulant is needed. Sometimes an erysipelatous rash is produced, usually passing in a few hours. A certain elevation of temperature follows. The leucocytosic effect generally lasts fourteen hours. It is claimed as serviceable in tonsillitis, indolent ulcers, incipient phthisis, malaria, diphtheria, etc. The power of nuclein of supplying building material and arresting disease germs make it more applicable than the antitoxins. Thyroid extract is claimed of value in a number of diseases, but specially in Graves' disease, etc.

In the debate which followed there was shown a great difference of opinion, one member having 100 intubations which he had been called to perform. In 20, serum was not used. Here the percentage of deaths was higher. His belief was in favor of its use, as 75 per cent. recovered while the others had 38 per cent. of recovery.

DR. BARKER, of Morristown, regarded it as a double-edged weapon needing care in its use. In one case that he knew 1,000 units were injected, the temperature and pulse reacted; vomiting was stopped by evening, had a comfortable night, in the morning appeared to be doing well. Then 1,500 units were injected, vomiting soon recurred, and death in the evening. Let well enough alone. Here there was no need of the second injection.

DR. DALAND, of Philadelphia, was in favor of the remedy. Many facts must be considered. Formerly many cases were not called diphtheria which are now decided to be such. It is unquestionably the reason of the lessened mortality because of the serum injections. It is difficult to estimate the epidemic influence. Suffocative cases occur less in the hospitals. It is a powerful remedy and needs much care to apply it. He had good results from the thyroid extract in exophthalmic goitre.

Another member had statistics of 5,000 cases and no accident, hence we are justified in employing it. Several others spoke on the subject, and the opinion appeared largely in favor of the serum and the thyroid extracts.

DR. C. R. FISHER read a paper on "Antisepsis." With this we may operate in a farm house with much better hopes of good results. He did not believe it was necessary before delivery to employ antiseptics, but the hands and the canal should be protected by this means at every examination. Puerperal fever was not now epidemic as formerly because of antisepis. Antiseptic surgery is now simplified, we no longer spray the room, etc.; that was an abuse of it.

DR. MCEWAN read a paper on "Chloroform Narcosis." His conclusions were: 1. Chloroform is a dangerous drug. 2. Its dangers can be reduced to a minimum by the most scrupulous attention and conscientious care on the part of the anesthetizer. 3. That the administration of chloroform properly could only be done by one person having charge of it, and it is not a time to assist or to indulge in conversation with a bystander, or to watch an operation in order to familiarize oneself with the steps of scientific procedure.

The officers for the next year are: President, Dr. T. J. Smith, Bridgeton; first vice-president, Dr. D. C. English, New Brunswick; second vice-president, Dr. C. R. P. Fisher, Bound Brook; third vice-president, Dr. Luther S. Halsey, Williamstown.

The next meeting will take place in Atlantic City, fourth Tuesday in June, 1897. It was agreed that the Committee of Arrangements might arrange for a three days' session.

American Neurological Association.

Annual Meeting held at Philadelphia June 3, 4, 5, 1896.

(*Concluded from page 1265.*)

DR. N. E. BRILL of New York read a paper on

THE STATUS OF OPERATIVE PROCEDURE AS A REMEDIAL AGENT FOR EPILEPSY.

This paper was a protest against promiscuous operation and surgical treatment in both essential and chronic epilepsy. He favored the removal of depressed bone where there was evidence of depression, as in these cases he had seen good results. In cases due to pathologic conditions, he took the position that craniotomy with excision of the cerebral cortex was unjustifiable, owing to, first, the bad results as far as amelioration is concerned, attending the operation; to our inability as yet to make absolute diagnosis as to the character of the pathologic lesion which occasioned the epilepsy. He cited cases to show that where a positive diagnosis has been made previous to the operation, when the skull was removed, the dura torn back and the brain excised no evidence of cerebral disease or defect was found. He argued further that there was an appreciable risk in the operation even when done with the most careful attention to technique; that fatal cerebritis and meningitis were by no means rare; that death occurred even on the operating table from shock; that we had no right to take even the slightest risk when the chances of amelioration or cure were so problematic unless the civilized world and a legal code endorsed the Spartan doctrine of destroying defective children. With such a purpose in view the thought of operation might possibly be justified. Against indiscriminate surgical interference, he voiced the protest of Lucas, Champonnière and others. As for the operation of craniectomy in epilepsy, he could find no justification whatever, especially when viewed in the light of our ignorance as to the pathology of the disease. He advocated conservatism and demanded that the clinician should hesitate before he ratified surgical measures, as an ameliorating agent in these cases. He regarded the large number of reported cases as a striking result of the clinician's desire to prove his skill in diagnosis by an antimortem operation and concluded by saying that no operation should be recommended unless the diagnostician should satisfy his conscience that the signs of disease were such that there could be no possible doubt as to the absolute presence of a definite pathologic condition, the character and nature of which he had absolutely determined previously.

DR. A. G. GERSTER in discussing the various papers on epilepsy, spoke on the different methods that have been employed in operative procedures. He referred to the fact that the circular saw was considered defective on account of the slowness of its work and the consequent danger of injuring the dura mater and stated that he had found a chisel more desirable than the trephine. In his opinion, the danger of injuring the dura mater is nil. He also considered the V-shaped chisels as too slow and unsatisfactory, as they have a very narrow groove, and penetration of the thinner lamellæ and injury of the dura mater may occur. He referred to Krause's modification of the circular saw and stated that even this did not entirely obviate the possibility of injury to the dura mater. He considered the greatest danger in cranial operations to be that of hemorrhage, and stated that unlike arterial hemorrhages, which could be easily stopped, it was the continual oozing of blood that was difficult to control. He considered any apparatus by which the skull could be opened in ten or fifteen minutes an excellent improvement and he was very glad to see an instrument invented by a Western man which would permit of satisfactory and rapid work. This instrument is built on the principle of the ordinary dental engine; it is very readily sterilized and does not require any expensive apparatus. An incision is made in the usual way and the extent and size of the flap having been defined, drill No. 1 is inserted, the object being to penetrate the entire thickness of the skull, the diameter consequently being a little larger than that of the other two. After outlining with drill No. 1, drill No. 2, which is smaller and sharper, is inserted. This is followed by drill No. 3, which is placed in the aperture made by drill No. 1. As soon as this is finished the flap can be pried up and the section laid open. The first case in which Dr. Gerster used this instrument, the operation took nineteen minutes, while the last took less than four minutes.

DR. M. ALLEN STARR referred to operative interference in epilepsy and stated that there had been a recurrence in every case and none of them had been cured. The first operation was done in October, 1889, and all the operations were performed on carefully selected cases by one of the most skillful operators in the country. No case has been operated on where

there has been very long duration between the trauma and the fit, nor any case of idiopathic epilepsy. With regard to the exsection of cysts, Dr. Starr mentioned cases that he had seen die on the table. He referred to a case operated upon by Dr. McCosh, who exposed considerable area, laid back the dura and discovering a clot upon its inner surface, he scraped and thoroughly curetted that region. The child had no paralysis and for a time recovered. Concerning abscess of the brain he has seen twelve cases of which eleven were operated upon. In each case an abscess was found either at the operating table or at autopsy. Of these operations three recovered. There are cases of brain abscess where the temperature is very irregular, varying between 98 and 106. There are also many cases which improve without any operation. Concerning the neurologic side of the question he did not think there was any connection with aphasia. He referred to an interesting case of aphasia in which an abscess was found in the temporal lobe. He mentioned another case in which the symptoms pointed to a tumor in the left hemisphere. The patient had epileptiform convulsions with unilateral paralysis. At the operation the tumor was found in the right hemisphere and there was perfectly good decussation of the motor fibers. In his opinion the days of trephining were over and the question now was how to make the flap and what instruments to employ. He stated that Dr. McBurney was doing very rapid work, performing operations in from fourteen to seventeen minutes with chisels and gouges, the gouges being but two mm. in width and the chisel being very sharp and narrow. As to the condition of exophthalmus, he could not understand how this could be caused by brain tumor except it lay behind the eyes.

Dr. W. W. Keen mentioned that paralysis frequently resulted from the injury to the brain caused by the tumor and the surgical interference. In Dr. Thomas' case there was nothing but a moderate paresis of the lower face and a moderate aphasia. After the mechanical interference there was no paralysis, but there was a diminution in the aphasia. He exhibited a tumor removed in December 1889, from a patient who is to-day living and well. In his opinion it seemed as though the removal of large tumors was less dangerous than small ones and if this be true it is doubtless due to the fact that in searching for tumors, one is apt to inflict an amount of injury upon the brain which is incompatible with recovery. During the past ten years the advancement in brain surgery had been very conspicuous and at the present time we are able to draw reasonable conclusions as to the result. He has not reported any of his own cases as he desired sufficient time to elapse to form an opinion as to the ultimate results. Although his experience had been moderately large, he is not able to report a single case cured and by cure he meant that after a reasonable time had elapsed the patient had had no fits. He was not willing to accept one year or even two and thought three should be exacted as the time limit to form an opinion. Although at the end of three years the patient may be still a sufferer, yet there will probably be great amelioration. He considered it worth while in nearly all cases to operate as he thought the results had been sufficiently satisfactory to warrant it and he stated that he would rather run the risk of any operation than go through life with such a frightful disease. As to idiopathic epilepsy he would not operate, but in Jacksonian, he considered operation justifiable judging from a number of cases recently reported. It is his practice to operate whether there are brain symptoms or not, but to refuse operation in cases that have gone on for many years. In his opinion at least twenty years should elapse before this question can be settled to the satisfaction of the profession. He did not think that 50 per cent. of the cases would ever be cured, but that a sufficient number will be benefited to make it worth while to run the risk of operation.

Drs. H. M. Thomas of Baltimore and W. W. Keen of Philadelphia reported a case of a large tumor removed from the brain with wide opening of the lateral ventricle. The patient, a young man of 19, with an excellent family and personal history and no history of accident, in December 1895, had an attack of intense headache and vomiting, but without optic neuritis. The latter symptom followed in the middle of January with blindness later in the right eye, slight vision remaining in the left, slight protrusion of the left eye-ball, pupils equal and normal, smell, hearing and taste unaffected, paresis of the lower right face, sensation and the muscles of mastication unaffected, no muscular weakness in either the arms or legs, but there was a good deal of muscular restlessness of the right hand, persisting even during sleep. Reflexes present, mental condition poor. He was dull and apathetic and sometimes slightly wandering mentally. After the early headache and vomiting, neither of these was a marked feature. There was slight aphasia. Drs. Osler and Starr saw the patient with Dr. Thomas and the conclusion reached that it was a tumor in the left frontal lobe, probably at the base of the second frontal convolution and subcortical. On May 10, Dr. Keen operated. The bone was chiseled from the temporal fossa parallel to the eye-brow and a little above it nearly to the middle line, then backward nearly to the fissure of Rolando, then downward again into the temporal fossa. This large flap was reflected and the dura opened. The tumor presented through a rupture of the cortex at the base of the second frontal convolution as had been diagnosticated. After ligating some vessels at its border, the tumor was easily scooped out by the fingers. The lateral ventricle was then seen to be widely open. To prevent blood filling the ventricle and passing into the third and possibly the fourth, the anterior part of the ventricle was packed with a strip of iodoform gauze. This was removed at the end of the second day. After the operation there was no increase whatever in the paralysis. In two weeks the patient had entirely recovered. The tumor was 7.5 cm. long, 5.5 cm. broad and 4 cm. deep and weighed two and a half ounces. It was a hard non-infiltrating sarcoma.

"A Case of Cerebral Abscess Situated in the Posterior Part of the External Capsule (involving the medullary substance of the first temporal convolution, also the posterior part of the lenticular nucleus, and extending into the subthalamic region), with some Considerations in Regard to the Constitution of the External Bundle of Fibers in the Cerebro-Peduncle," by Drs. Charles K. Mills and Wm. G. Spiller.

The authors related the details of the case and stated that at the autopsy an abscess was found in the left hemisphere just above the level of the callosum. Both tympanic membranes were normal and microscopic examination of the pus from the cerebral abscess revealed only the ordinary staphylococcus pyogenes aureus. In view of the frequency of cerebral abscess after suppurative processes in the lungs, it may be added that merely spots of catarrhal pneumonia were found in both lungs. No degeneration was noticed anywhere in the motor tract. The fibers from the first temporal gyrus were almost entirely destroyed as well as those from the upper anterior part of the second temporal convolution. And as no degeneration had been found within the latter bundle of the peduncle by the method of Marchi sixty-eight days after the first attack and twenty-eight days after the second, it was considered that the case demonstrated the fact that no fibers from the first temporal and the upper anterior part of the second temporal gyrus including a portion of the upper middle of this gyrus enter the fasiculus of Turck. In another case of hemiplegia in which death occurred three weeks after the attack the authors were able to show intense degeneration by the method of Marchi.

Dr. J. Arthur Booth of New York, read a paper on and presented a case of

EDEMA OF THE EYELIDS IN GRAVES' DISEASE: THYROIDECTOMY.

After detailing at some length, the circumstances connected with the patient presented, the author drew the following conclusions: 1. Slight decrease of the edema situated in the extremities is a common occurrence in Graves' disease, but this symptom limited to the eyelids is very seldom seen. 2. In distinguishing these various forms of swelling it is necessary to be guided by the position and the degree. If situated only on the face and upper limbs, or if unsymmetrical it is entirely of nervous origin. It may be that it effects the feet, but this will be slight and temporary. 3. These symptoms are evidently of vaso-motor origin and are probably due to a paralysis affecting the constrictor nerves, manifestations of peripheral neuritis. 4. Limited to the eyelids, it may be due to a paresis. If this be true, however, it is strange that we do not meet with it in other palsies of the muscles. 5. Thyroidectomy carefully performed and by one cognizant of the occasional complications, such an operation is not as dangerous as is generally believed. 6. From operative interference in Graves' disease, we may expect an improvement to some extent.

Dr. M. Allen Starr said that the percentage of death in operations upon the thyroid gland was high and that he knew of several cases operated on in New York where every precaution had been taken, but death had resulted from some unexplained cause, although the ordinary surgical shock was not present.

Dr. Philip Coombes Knapp of Boston read a paper on

THE NATURE OF NEURASTHENIA.

The author's study was based on one hundred cases in hospital and fifty in private practice. The chief symptoms were nervousness and weakness, the "irritable weakness" which is considered an essential symptom of neurasthenia. Next in frequency came headache, indigestion, insomnia and epilepsy. Depression, backache and other symptoms were much less common. Neurasthenia was considered to be analagous to

chronic fatigue and to be due primarily to exhaustion in the cells of the brain cortex. Mental depression was not infrequent, but it was usually secondary to a neurasthenic condition or the physiologic result of the cause (grief, worry), which had produced the neurasthenic. Among the morbid fears were first those pertaining to the physical welfare of the patient often based upon physical symptoms and having a rational basis, although resting upon false premises and ignorance of the significance of these symptoms. In other cases the fears were of a different character and these cases were not neurasthenia, but true hypochondria, a mental state akin in some degree to paranoia. The second class of morbid fears were the so-called phobias. These fears exist in perfectly healthy people who, under their influence, may be drawn into considerable anxiety and distress. In other cases the morbid fears were secondary to certain unexplained ideas. These fears and unexplained ideas are not uncommon in mild forms in perfectly healthy persons. In the severe forms they exist as independent psychoses. These different psychoses may exist independently without any trace of neurasthenia. It will be found in only a small percentage of neurasthenic cases which is greater among private patients. When found in neurasthenia these fears and unexplained ideas are indicative of the coexistence of another affection.

DR. THEO. DILLER said in his opinion in all such cases it was of primary importance to search for neurasthenia as it is a question whether or not they are the outcome of a neurasthenic disease or a degeneration.

DR. BURT G. WILDER referred to the case of a distinguished etymologist who was made very uncomfortable by the mere presence of a cat even if he could not see it and stated that this fear was greatly intensified if the floor was carpeted.

DR. SPITZKA considered it important to separate the inherent cases from the acquired.

DR. HENRY S. UPSON of Cleveland, read a pager on

NERVE DISTURBANCES FROM INDIGESTION.

Three cases were cited. While conclusions from so few cases are not warranted, yet the speaker believed that the type of nerve disturbance found in typhoid is found in intestinal indigestion without the intervention of this disorder. It may easily be confounded with mild melancholia or neurasthenia, which presents many points of similarity. It must be carefully differentiated from nerve diseases which are amenable to treatment, which treatment should not consist exclusively in the administration of an antiseptic.

DR. LANGDON—One must not forget that bacteria are of two kinds, the conservative and the pathogenic and there may be a third kind, the indifferent. It is well known that we could not live in our streets except for certain bacteria and it does not follow that because their presence may have a doubtful effect in some cases it will do so in all. He had obtained good results by the administration of mercury given in the form of calomel, which he claimed is converted into bichlorid of mercury by hydrochloric acid.

DR. THOMAS J. MAYS of Philadelphia read a paper on

TOXICOSIS OF THE NERVOUS SYSTEM AS A CAUSE OF PULMONARY CONSUMPTION.

Dr. Mays said disturbance of the nervous system and especially of the respiratory nerves induces some form of pulmonary disease and frequently pulmonary consumption. That diseases of the pneumogastric nerves leads to these disorders is confirmed by the opinions of Chevan, Holland, Copland, Laycock, Allbutt and Clouston, which are quoted. Besides, clinical proof and post mortem evidence are adduced from cases found in medical literature. Alcohol, syphilis, mercury, lead, typhoid fever, diphtheria, measles, whooping cough, mumps, influenza, cerebro-spinal meningitis, beri-beri, rheumatism, etc., intoxicate the nervous system and become prolific sources of pulmonary mischief. Of all these poisons alcohol is probably most sure to bring about pulmonary diseases through the nervous system, and a number of cases giving post mortem proof of this are cited. Syphilis and most of the other poisons mentioned are treated in the same manner and are shown to have the same effect ultimately in a great many instances. The chronicity or the acuteness of the pulmonary disease which is thus dependent on the nervous system, are governed in a large measure, 1, by the virulency of the poison; 2, by the amount and frequency with which it is introduced; 3, by the persistency of its action, and 4, by the facility or difficulty with which it is excreted by the body. They all vary in this respect. Alcohol is quickly eliminated, but its harmfulness depends on its being taken frequently and continued for a long time. A single infection of syphilis permeates the body and the virus remains for years. Mercury and lead enter the body very gradually, but are excreted very slowly. The poisons of whooping cough, influenza and cerebro-spinal meningitis, having a selective affinity for the pulmonary nerves, are liable to be followed by a more speedy disease of the lungs. This is the case with those of typhoid fever, diphtheria, measles and mumps. Uric acid being a normal constituent of the blood, only becomes harmful when it accumulates persistently in excessive quantities.

DR. F. W. LANGDON of Cincinnati, presented a paper entitled

EPILEPSY AND OTHER CONVULSIVE DISEASES; A STUDY IN NEURODYNAMICS.

The anatomic digest accepts the neuron of Waldeyer as the anatomic and physiologic unit of the nervous system, especial attention being called to its more complex construction as elucidated by Max Schultze, Schaefer and Gowers. Physiologically, attention is directed to the later views that the cell-processes or their terminal endings are chiefly concerned in dynamo-genesis or conversion as opposed to the older doctrine that the "cell" (neuron-body) was the chief agent of action. Pathologically, objection was raised to the prevalent view that "chemical instability" or "explosion" of cell areas are the main factors in convulsive action. In its place, the view was advanced that definite defects of structure in the neuron-processes, chiefly those of the great pyramidal projection tracts, are responsible for the convulsive phenomena. The foregoing considerations, anatomic, physiologic and pathologic, would appear to justify the following propositions as a working hypothesis: 1. That epilepsy, the choreas and probably most convulsive disorders are the dynamic expression of an inhibitory insufficiency, not indications of over-production of nerve energy nor "explosions" due to a "molecular instability" *per se*; 2, that the cause of this inhibitory insufficiency is to be sought for in the end brushes of the collateral processes of various cortical neurons, the situation varying with the "type" of the disease, whether sensory, psychic, or motor; 3, that the defect consists most probably, in a *structural incompleteness* (small capacity, defective insulation, imperfect contact) or a *numerical deficiency*, or both, in the collateral processes of the neurons referred to; 4, defective collaterals may favor occurrence of convulsions in two days: (a) by impairing connection with other neurons (inhibitory, storage, etc.); (b) by increased resistance to "overflow currents," causing temporary overcharging of motor axis-cylinders. This conception of the anatomico-dynamic basis of convulsive phenomena I would call the "collateral theory." On this basis, cases of epilepsy are classed under three groups, each of which presents important differences as regards prognosis and treatment. 1. *Primary or developmental* type, compromising the "idiopathic." Cases under 20 years of age. In these, the younger the subject and the better the heredity and environment, the better the prognosis under intelligent treatment. Ultimate result depending on the possibility of promoting further and equable development of collateral communications with inhibitory mechanisms. 2. The *accidental* forms. Those due to trauma, syphilis, lead toxins, etc. The prognosis here varying with the longer or shorter duration and the possibility of removal of the cause; being always favorable so long as permanent structural changes in collaterals and inhibitory mechanisms have not occurred. 3. The *degenerative* type. The rare cases of adult life and old age (not accidental) belong in this category. Here palliation only is to be expected as in degenerative changes elsewhere. In all forms the rational indications for treatment are: To lessen the incoming sensory excitation, by diet, hygiene, occupation, medicines; and so lessen the intensity of motor responses which are not provided with suitable overflow and inhibitory mechanisms.

DR. IRVING C. ROSSE read a paper on

NEWSPAPER RABIES.

After referring to the way in which newspapers deal with the subject of hydrophobia and allied affections, Dr. Rosse stated that from bibliographic references and experimental research he felt the following conclusions were warranted: 1, that the notion of a toxico-rabid bite is an old one being mentioned by Homer, but not by Hypocrates; 2, but few physicians have seen a genuine case of this complex and badly elucidated affection; 3, among competent surgeons and neurologists there is a wide difference of opinion, and even irreconcilable diversity as to the existence of genuine hydrophobia in man; 4, there is also considerable diversity of opinion concerning the exact value of the Pasteur method; 5, there is a difference of opinion as to whether pseudo-hydrophobia ever produced death; 6, in view of the uncertain knowledge of the disease and aside from making sensational items of such matters, newspapers are not to blame for publishing statements inconsistent with biologic or medical facts, since they merely reflect current opinion, and holding the mirror up to nature gives us, so to speak, a radiograph of what is going on in the minds of medical men.

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SATURDAY, JULY 4, 1896.

PANICKY SANITATION.

It has been published as a fact that a law has been proposed in the British colony of New Zealand prohibiting the admission of all tuberculous individuals and imposing heavy penalties on ship captains and steamship companies which furnish them transportation to the country and permit them to land. If carried out this proposition will be an advance on any sanitary precautions heretofore attempted and will doubtless meet with the approval of some of the more ardent sanitarians. New Zealand is a group of islands, a rather extensive one to be sure, with only comparatively limited means of communication with the rest of the world and it is possible to conceive of a much more perfect isolation there than is practicable in any continental territory. Whether the New Zealanders will be able to keep out the ubiquitous bacillus tuberculosis or do anything more than afford protection from foreign competition to the home produced article is a question, and on the grounds of ordinary humanity, taking this uncertainty into account there are some objections to the proposed enactment. Latent tuberculosis certainly can not be thus excluded, or any other unobtrusive form of the disease unless some tuberculin or other test is applied on passengers and others who reach the country by the ordinary routes of travel, or better through some consular agency before starting. Only in this way can the disorder be excluded; the few pronounced cases will hardly figure among the manifold other chances of admission of the germs. Then there are to be taken into account the sources of infection already existing in the country and the opportunities it may have of self propagation. Of course the plans must include the extirpation of these. When all is done and the islanders have adapted themselves to the new conditions, supposing these to be possible, is there not yet a possibility that they may be more than ever vulnerable to any accidental introduction of the infection, by reason of their lack of the possible immunity produced by familiarity with and habitual resistance to the microbe. That such an immunity exists in case of many diseases to some extent is highly possible from the fact of the quickness with which they spread in populations hitherto unaccustomed to them. Such immunity can be easily accounted for by the law of natural selection alone, to which there is no reason to believe tuberculosis forms any exception. If New Zealand, or any other country, has the climatic and other local conditions favorable to tubercular disease and if it already exists there as is undoubtedly the case, the exclusion of pronounced cases by the severest legal enactments and penalties will be a very poor method of defense as compared with proper hygienic local regulations. If on the other hand, its climate is such as to make it a desirable sanitarium for consumptives it would be almost a crime against humanity to exclude them from its benefits, by measures that can at best be insufficient for preventing the introduction of the disease and inexcusable in so far as it already existed in the country.

It is true that it is said that tuberculosis has increased among the natives of the Riviera and some other regions resorted to by consumptives, but these localities have nevertheless not lost their climatic advantages and tuberculous invalids still find benefit from residence there. It is not unfair to presume therefore that the natives have not fully availed themselves of their hygienic privileges, or that they have not yet acquired the immunity possessed by residents of less favored localities. There are few disorders that in a general way are more amenable to local sanitary and hygienic measures than is tuberculosis, and there is hardly one that is more generally distributed or harder to control by isolation. There are also probably very few other serious diseases the effective contagion of which is more dependent upon the susceptibility of the individual; it would be hard to find many or indeed any adults in this and most other civilized countries who have not been repeatedly exposed to its germs. Indeed, if what apparently competent observers state is true, that 18 per cent. of domestic cattle are infected with tuberculosis, it might be hard to find a weaned or bottle-fed infant that had not repeatedly imbibed the contagion, and yet the race survives, the average longevity increases and the population question still troubles the Malthusians.

It must not be inferred that it is intended in these remarks to object to or disparage any reasonable attempt to protect the public against so great a scourge as tuberculosis. It is not necessary however for the State, or the public, to treat the consumptive as a leper, and such extreme measures as the one noticed are not only not humane, but can not be said to be in the true line of progress. They obscure and rather tend to the neglect of the less obtrusive but far more efficient local hygiene that is the true defense against the disease. Such measures can be justly characterized as panicky legislation, and cowardice is not an element that favors success in strife with disease, and inhumanity which is its common accessory, is undeserving of it. Tuberculosis does not increase where it is properly managed, and even with the prevalent carelessness in regard to disinfection or destruction of sputa, indiscriminate expectoration, etc., it is no greater a scourge in long settled communities than it has been in years past. With the present enlightenment as to its causes and prevention, there is no reason why it should not decrease with the employment of early rational precautions against infection.

THE QUESTION OF PHYSICAL EXAMINATION.

At the recent meeting at Philadelphia of the Association of Military Surgeons of the United States, during the discussion of the paper prepared and read by MAJOR PAUL R. BROWN, Surgeon U. S. Army, on "Modern Methods of Anthropometric Identification, so far as the United States Soldier is Concerned," in which he very earnestly advocated the system based on anatomic and descriptive data devised by BERTILLON, of whose work he is the translator, COLONEL CHARLES H. ALDEN, the Assistant Surgeon-General of the U.S. Army, and others of that Department, declared their preference for the method now in vogue in the Army of recording prominent marks, scars and peculiarities as proofs of identity, for the reason among others that the French plan proposed was primarily associated with the recognition of criminals. CAPTAIN MYLES STANDISH, Mass. V. M., said that the mere fact that BERTILLON'S method was employed in connection with criminals would make it difficult or impossible to adopt it in this country, and CAPTAIN ARTHUR R. JARRETT, N. Y. N. G., was also of opinion that in his State the men would feel it an indignity to be measured and inspected by the same procedure as was employed for criminals, which caused MAJOR HAVARD of the Army to remark that this objection reminded him of MARTIN LUTHER'S reply, when he was reproved for playing dance music, that he did not see why the devil should have all the good tunes.

The trend of the discussion illustrated one of the difficulties experienced in this country in enforcing any salutary regulation. The sentimental objection is alleged that the liberty of the individual is encroached upon by requirements special to one particular occupation or to one class of persons, and resistance is upheld to the point of establishing the license to do as each one pleases without regard to the interests of others or to the better control of public affairs. Only in recent years has the practice obtained of uniforming railroad employés; still later that of requiring letter-carriers to wear a distinctive dress; and only within the past year has COLONEL WARING been able to clothe the force of the New York Street Cleaning Department in a prescribed uniform. The writer recalls the almost rebellious refusal of the female nurses of the Maryland State Hospital for the Insane, of which DR. ROHÉ was Superintendent, to wear a uniform dress, and he only succeeded by inducing the prettiest of the lot to try on a most becoming and coquettish costume, with which she was so satisfied that she concluded to keep it on, all the others quickly following suit.

Municipal administration in this country is hampered more by this intolerance of restraint, however justifiable, than by any other cause. The same individuals, who in Great Britain, Germany, France, Italy and Russia, conform with no apparent reluctance to the most stringent requirements, are the most defiant of rules of propriety as soon as they fall within the limits of this law-contemning country. It is only necessary to watch the Irish and German drivers of beer-trucks, grocer-wagons and butcher-carts turning the corners of public thoroughfares at full speed without regard for feeble pedestrians, and offensively unclean Italian and Russian laborers crowding into public conveyances to realize how the lax administration of our cities has transformed the alien serf into a very unwholesome variety of American boor. Within a few weeks, the Board of Health of New York nerved itself to issue a regulation that "spitting on the floor of public conveyances is a nuisance, is frequently the means of communicating disease, and is hereby forbidden," which was reinforced by an order of the General Manager of the several street railway lines that "employés of the company are required to call the attention of passengers violating the above order of the Health Department either in the cars, waiting-rooms, or on the stairways and station platforms of the company, to the provisions of the same." The fulmination was printed on cards which have been hung where they can scarcely be seen, employés are supremely indifferent to the injunction and the spitters continue their disgusting practice.

It can not be asserted that indifference and hostility to sanitary and other municipal regulations are inherent to the republican form of government, since both in France and Switzerland, the latter venerable among republics, the citizens render the same prompt obedi-

ence as the Chinaman, who obeys the law because it is the law, in the same spirit as his child who obeys him because it is his duty to obey. During our civil war, an American traveling in Europe became acquainted with a young Swiss merchant who was lamenting that he had been called upon to perform his military service in the field at a time when his business required his presence, and who, when asked by the American, "Why do you not hire a substitute?" as so many thousands of the citizens of the Great Republic were doing at that very time, replied, "Hire a substitute! Why, it is my duty to go"—and he went.

Recurring to the initiatory text, which suggested this acticle, the alleged objection to the personal indignity and humiliation of a physical examination is really only a pretext, and intended to conceal the very physical defects it is the prime object of the examination to discover. There is no more important duty of the medical officers of the army, navy and marine-hospital service than this of physical examination. Upon its proper performance depends the efficiency of the personnel of the several services. It secures the retention of the fittest—of those least predisposed to disease and most resistant to the morbific influences of climate and occupation—of the most vigorous and best able to perform arduous and exacting labor. The recognition of deserters, convicts and other undesirable recruits is only incidental and based upon information obtained originally with another object. "So far as the indignity and humiliation are concerned," said MAJOR VALERY HAVARD, U. S. A., in supporting MAJOR BROWN'S advocacy of the BERTILLON method, "when a man is stripped and his marks and defects noted he has been subjected to as much indignity as he can be, and therefore I prefer the most scientific system based on anatomic data." MAJOR PHILIP F. HARVEY, of the U. S. Army, goes even farther, in that he proposes to prevent the enlistment of undesirable men by a study and interpretation of the marks of degeneracy, indicating moral defects and criminal tendencies in the individual.

The individual's body is his own most precious possession, but he has no right because of this exclusive ownership to exact concessions from other bodies that may be prejudicial to the general welfare. In some sequestered spot or solitary island, he might go clad or unclothed, and mutilate, disfigure or destroy it without let or hindrance, but where other bodies come within its sphere the inalienable property right has to be restricted. Examinations conducted in privacy by competent and experienced professional examiners, with every regard to decency and delicacy, can be no more objectionable than the diagnostic explorations of the attending physician; and the record of the shape of the nose and other features, the configuration of the body and limbs, and the other points of the congenital conformation of the individual are as proper as the noting of a scar on the left cheek, a wart on the nose, or an eagle and anchor and the letters A. B. in indelible ink on the left breast. It is gratifying to learn from medical officers of the National Guard of great States like New York, New Jersey and Pennsylvania, that they are aiming to establish the same system of physical examinations as prevail in the national services, and we trust that the recent discussion before the Association of Military Surgeons may have the effect of making the practice general in all the States and Territories, and that the decorous submission to requirements in this instance may lead to a better disposition to recognize the value of law and order in other matters, especially in those concerning the public health. It is not anticipated that any military surgeon will object to the most thorough physical inspection, though hardly to the extent of introducing a rectal speculum or urethral catheter or requiring the subject to urinate under observation as has been done in Europe. Soldiers and sailors of all men should be trained to regard their bodies in a manly spirit. Men bathe together without remark and the familar exposures of the barracks and bath-deck are neither provocative of libidinousness nor shamefacedness. The cadets at the U. S. Naval Academy are annually subjected to nude inspections, which are made matters of record and are invaluable elements of their physical history. Properly conducted physical examinations of the inmates of girls' schools and colleges would do much in the way of convincing parents and skeptical teachers of the progressive deformation of young women by faulty dress, and now that the injudicious use of the bicycle is distorting the plastic pelves of immature females, such examinations will be of incalculable benefit. The greater attention paid to the normal development of the body the better for the race, and the general adoption of BERTILLON'S system of physical inspection and registration by the National Guard of the United States will be the indirect means of better acquainting the members of that organization with their bodily selves.

THE PUBLIC HEALTH DEPARTMENT.

We have received the following letter from DR. JEROME COCHRAN, State Health Officer of Alabama, Chairman of the Committee on a "Department and Secretary of Public Health" appointed by the ASSOCIATION some years since, of which the late DR. C. G. COMEGYS was the first chairman:

MONTGOMERY, ALA., June 29, 1896.

To the Editor: In the JOURNAL of the 27th there is an editorial which has occasioned me no little surprise. It begins on page 1273 and is entitled "An Explanation Is in Order."

The explanation is very simple. After several years of unavailing work the Committee on Department of Public Health presented a report at the Atlanta meeting of the ASSOCIATION proposing a new departure in the effort to obtain

national public health legislation. This report is to be found in the JOURNAL for May 16, beginning on page 988. It was discussed by the ASSOCIATION and unanimously adopted with all of its recommendations. Among these recommendations is one authorizing us to invite the coöperation of the conference of State boards of health.

I accordingly attended the meeting of the conference in Chicago and laid before it the plan for a national health bureau which had been approved by the ASSOCIATION and asked the conference to approve said plan, which it did. I also requested that the conference recommend each State Board of Health to appoint one member of a committee to act with the committee of the AMERICAN MEDICAL ASSOCIATION in securing for the proposed bill the favorable consideration of Congress. This also the conference agreed to.

That is the whole story; and it seems not a little strange to me that the JOURNAL of the ASSOCIATION should begin in such hot haste to oppose the plans and orders of the ASSOCIATION. The United States mail brings Chicago in easy communication with Montgomery, so that it would have been easy for the Editor of the JOURNAL to have obtained all the facts from the cha .nan of the committee. I will venture to suggest that common justice dictates that you should give this explanation as prominent a place in the columns of the JOURNAL as was occupied by the hasty editorial complained of. I have the honor to remain yours truly,

JEROME COCHRAN, M.D., Chairman of Com.

We only reiterate a demand for what we believe the ASSOCIATION wants and what is expressed in the very name of the committee on a *Department and Secretary of Public Health*. The following extracts from the committee's report (printed in full in the JOURNAL for May 16, 1896) show that we have made no mistake. After reciting the previous failure to obtain a Board of Health, Dr. COCHRAN as chairmain on the Committee on a Department of Public Health, says:

"In the meantime, the Marine-Hospital Service, which in 1890 had already been invested with some important health functions, was by the Act of 1893 converted into a National Health Department with very large and far-reaching powers and abundant means. It is not called a department of public health, but is a Department of Public Health in fact.

. . . . . .

It seems to us to be a fundamental proposition that we shall have but one National Department of Public Health. This being conceded, one of three courses remain open to us.

1. We may devise and advocate a plan to deprive the Marine-Hospital Service of its public health functions, and for the establishment of an entirely new department; or,

2. We may accept the Marine-Hospital Service just as it stands as a department sufficient for our present use; or,

3. We may endeavor to improve the Marine-Hospital Service and make it a more satisfactory National Health Department than it now is.

It would seem that this last method promises to be the most fruitful of beneficent results; and the question then arises as to the modifications that may be wisely made in the existing law.

Such a scheme as this would probably command the approval and support of the National Conference of State Boards of Health, which Conference is quite as deeply interested in movements of this character as is the AMERICAN MEDICAL ASSOCIATION.

As the conclusion of the whole argument, we recommend that we be authorized to draw up a new bill along the lines we have indicated, and that we be authorized to invite the cooperation of the Conference of State Boards of Health and of the American Public Health Association in our endeavor to have the proposed bill enacted into law."

The following was the discussion thereon.

DR. HIBBERD—I move that the report of the committee be accepted, the plan outlined adopted, the committee continued and enlarged by the appointment of a member from each State. Seconded.

DR. I .N. LOVE—If I understand the proposition rightly, it provides for a Department of Public Health built upon the present foundation of the Marine-Hospital Service. I am therefore in favor of it. It is an elaboration, a building up in a stronger and more definite shape of the public health department and quarantive service which we already have. When we consider that every other department of life is represented in our National Conference Board, or Cabinet, and yet public health is not represented, surely the dignity of medicine and the best interests of the health of the community demand such recognition, and I think the most practical way in which to accomplish this great and good work is by building up that which we already have and crystallizing it in the shape of a more dignified body.

DR. SUMMERS, of St. Louis—I think, sir, it is time for this ASSOCIATION to demand of the United States of America that it should be represented in its Cabinet at Washington. We can learn a great deal from the old Christian mythology, where Gabriel was the Secretary of State, Michael the Archangel or Secretary of War, and Raphael the Secretary of Health, who flew with his wings close to the earth and shed healing in his path. Now, I say, the time has come when this ASSOCIATION in its power and dignity should rise and demand of the government of the United States that it create a department of public health, as has been done in all governments of the world. This is the solution of the question. Twenty-five years ago I joined DR. COCHRAN in his efforts in public health matters in Alabama, and it brought out the fact that it was possible for the State to take hold of medicine and govern it accordingly.

The report was then adopted.

It is entirely clear that the members thought they were supporting a measure to create a *Department* of Public Health. The proposition was understood to be as stated by DOCTOR LOVE, a DEPARTMENT OF PUBLIC HEALTH built *upon* the present foundation of the Marine-Hospital Service.

That is a very different proposition from the one advocated before the conference. The latter simply provides for a Division of Public Health in the Marine-Hospital Bureau, the chief thereof to be appointed by the SUPERVISING SURGEON GENERAL; that is to say in effect that some subordinate in a bureau, itself subordinate to the Treasury Department, has sufficient power, dignity and authority to represent the important interests which ought to be intrusted to him, with credit to the American Medical Profession.

We do not think the chairman quite understands the sentiment of the ASSOCIATION on that point.

Has he submitted any proposition to make the Marine-Hospital Bureau independent? That would seem a proper move, as by the words of the chairman, "It is not called a Department of Public Health, but is a Department of Public Health in fact." Why then seek to place the chief of the Public Health Service two removes further from departmental independence? The head of the present bureau is not now independent; if it be, as DR. COCHRAN says, the real health service, why not make its chief the chief in fact, instead of merely authorizing him to "appoint" somebody, or employ a new clerk?

There is rarely time to discuss these questions on the floor of the ASSOCIATION, especially when the report is in manuscript, and no one knows what is in it unless fortunate enough to have a front seat. The question then finds its appropriate place for discussion in the columns of the JOURNAL, and we sincerely hope that our esteemed friend, with that courtesy and tolerance that has always distinguished him, will welcome criticism and well-formed opinions from other members of the ASSOCIATION.

In conclusion we might inquire whether or not DOCTOR HIBBERD'S duly seconded motion to appoint one additional member of the committee from each State has been acted upon. That motion was surely wise, and according to the minutes it was adopted.

THE MEDICAL JOURNAL AND THE "READING NOTICE."

The manager of a medical journal has his troubles quite apart from those of securing leader writers. One of the most annoying and at the same time one of the most unnecessary, is the unceasing demand from those who should know better, that the reading columns of his journal shall frequently present articles descriptive and sometimes eulogistic of some pill, powder or potion. The article thus presented as a "reading notice" is usually written by some impecunious or unknown M.D., who, for a consideration or gratuitously, has furnished our advertiser with this wedge to force the journal.

The thin edge is inserted when the article is written as a scientific one. There is a phase in this matter that is not quite understood. If Editor Jones or Editor Smith shall, as many do, decline to publish the material, then the advertiser may make it a personal matter and withdraw the advertisement. This procedure, we are sorry to say, is growing more and more frequent.

Let us ask advertisers to look this matter squarely in the face. There are two sides. Editor Jones, we may say, has given much thought to this subject, and wishes his esteemed friend C. C., of Selldrugs & Co., a large and prosperous business, but he can not comply with the request of the Messrs. Selldrugs & Co. He tells them in effect that he has only advertising space for sale in the advertising department. The scientific department of his journal, he explains, is not intended for advertisements, and in fact he has no right to sell any part of it. To do so would be an open violation of an implied contract with his readers.

The editor, as he warms up to his subject, continues: "There is still another point of view; we are carrying your advertisement, my dear friends, and we thank you very much, but our rates are low, and we think we are giving you an equivalent, why should you ask us to insert two advertisements when you pay only for one? If I send my office boy to your drug palace and buy a hundred pills, are you obliged to yield to his demand that having honestly bought the pills, he must now have a pound of bon-bons and a box of cigarettes? You would, my dear Merchant Prince, resent the impudence of the boy. Suppose now that we go ourselves, or write you a note threatening to withdraw our patronage, even to the extent of buying our next box of pills from your hated rival. You would very likely," says Editor Jones, "tell me that you sold the pills at a low price, and if you furnished anything more it would be a gift. You would perhaps say aside to your partner that the editor was coming very close to levying blackmail. I have not put the case to you," said Editor Jones, "on any sentimental grounds, as from the well-known philanthropy and public spirit of your long-established house I might easily do, but I have chosen a simple commercial standpoint and the case is only overdrawn in one particular, that is the dealer has *all* the articles for sale; in the case of the *Medical Journal*, the manager has no right to sell or give away his scientific space; that part of the journal does not belong to him for that purpose; it is actually already paid for by the subscriber."

CORRESPONDENCE.

Our Journal.

MONTCLAIR, N. J., June 7, 1896.

To the Editor:—I have just voted to move the publication office of the JOURNAL to Washington, D. C., and was actuated by the following reasons:

1. The JOURNAL is the organ of a great national Association which should know no local prejudice nor be controlled by any local body of men.

2. Any serial publication must in some measure respond to the influence of its environment, therefore, in the case of a periodical whose aims are so broad and whose spirit must be so catholic as those which the JOURNAL must display, unless it shall fail of its high mission, its seat of publication should be the most cosmopolitan possible.

3. Washington is the most cosmopolitan city in this country. It can have, from the nature of its institutions and government, no strong local prejudices.

4. It is, furthermore, the center of scientific thought as well as the national capital. The fact that it is not a commercial center fosters the scientific and literary spirit, and makes it a delightful place of residence as well as an advantageous literary workshop.

5. It has certain advantages for literary work over any other city in this country, because it contains the Congressional library, the largest general library in America, and the Surgeon-General's library (which has been rendered so available to all scientific readers by the work of Dr. Billings and his assistants). Washington contains also various other libraries, as well as museums and laboratories.

6. These advantages must in the nature of things tend to increase as time goes on, so that it is quite conceivable that, even if the publication of the JOURNAL shall be continued at Chicago for the present, it will be forced to go to Washington finally. Should this prove to be the case, it is obvious that the move had better be made now than later on.

7. The unfortunate defection from the ranks of the AMERICAN MEDICAL ASSOCIATION bids fair to heal in good time. This promise of better things has been brought about greatly through the powerful influence of the JOURNAL. If the JOURNAL shall be moved farther East, a happy outcome of these complications will come more quickly.

8. The JOURNAL is the only prominent medical publication in this country which is not issued from the press of some private publishing firm. Its publishers are, or should be, the entire medical profession of America. It must, therefore, be published in the interests of no set or clique; its opinions must be quite unbiased by any local interest, any spirit of business or any private scheme.

9. There can be no question that the medical profession as well as the laity *need* in this country one powerful, well edited and liberally supported medical journal, which shall be an acknowledged authority upon scientific medicine, State medicine, hygiene and medical ethics.

10. The high grade of scholarship, the breadth of view and the business sagacity which have been shown of late in the management of the JOURNAL, give every promise that it is bound to become such a publication as has just been described; in short, an American medical journal of which Americans may be justly proud.

11. It will take this high place all the sooner if its seat of publication, its general surroundings and its support shall be as favorable as possible.

12. If the present rate of advance in the character of the JOURNAL shall be maintained the title should become THE AMERICAN MEDICAL JOURNAL, and in smaller type. The words THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION should appear upon the title page.

13. While it is true that the character of a publication is influenced by its environment it is also true that a publication exercises an influence upon the thoughts and action of those in whose midst it may be published, and this influence naturally increases with the growth and power of the publication; it would be well therefore that the JOURNAL should be published in Washington by reason of the restraining and enlightening influence its presence may have upon our legislators.

14. Great questions of national health, national hygiene and physical well-being are now engaging the attention of scientific men the world over, and as intimated above the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION should be in a position to test the alleged discoveries in these lines and to impress what else may be found valuable not only upon the profession but upon our public men as well.

15. The advance of the medical profession in America in learning, dignity, wealth and power has been marvelous during the past two decades. There is no probability that there can be in these respects a retrograde movement. The times are propitious. The future of American medicine is bright with hope. Let the JOURNAL seize the opportunity to place itself at the head of the profession and let each and every one of the members of the ASSOCIATION forgetting all local pride and all sectional prejudice do all that in us lies to advance no particular sect nor interest, no especial State, county or city but the power and good name of American medicine and the prosperity of its medical association. Let us be broad minded and patriotic and sink all sectional feeling in our common love of our profession and our devotion to the healing art.

RICHARD C. NEWTON, M.D.

A Testimonial to Prof. N. S. Davis.

POMFRET, CONN., June 30, 1896.

To the Editor:—D. L.'s letter in the JOURNAL of June 20 in regard to a memorial to Dr. N. S. Davis reminds me that I have in my possession a medal struck in 1846, on its face a medallion and the words "N. S. Davis," and on the reverse the inscription "AMERICAN MEDICAL ASSOCIATION," and the date "1846." This medal was given to me by Mrs. Williams of this town, whose husband, the late Dr. Lewis Williams, was a delegate to the 1846 meeting, which I think met in Louisville, Ky.

S. BURDEN OVERLOCK, M. D.

NOTE.—This convention met in New York in 1846.

Treatment of Typhoid Fever.

JUNE 8, 1896.

To the Editor:—I have been much interested in the discussion of the "Woodbridge" treatment of enteric fever, and I am greatly pleased to see that many realize the necessity for fulfilling what I have long considered the essential requirements in not only this, but most, if not all, intestinal disturbances, viz.: Rid the digestive canal, promptly and thoroughly, of all offending or decomposing matter, together with the products of decomposition, thus preventing their absorption; render the contents of the entire tract aseptic as far as possible, and lastly—this and the first being, to my mind, the prime consideration—inducing decided alkalinity, as it is in acid media that most, nearly all, the obnoxious microörganisms thrive best. The degree of alkalinity should be positive and sufficient, and as, within reasonable limits, there is no danger of overdoing the matter, large quantities of alkali, preferably bicarbonate of sodium, should be given with sufficient frequency to maintain the condition.

While practicing in San Diego, Cal., I had many cases of enteric fever to treat, not one of which failed to yield promptly to the course of treatment here indicated, barring two, which were moribund as the result of intestinal hemorrhage when I first saw them.

I had recently on my hands a puny infant to treat, whose surroundings were in the highest degree unfavorable, suffering from entero-peritonitis, to which I gave freely sod. bic., 2 drams, and sod. et pot. tart., 1 dram, in milk every two hours. When I first saw the child it was to all appearances nearly dead; thighs flexed upon the abdomen; too weak to even cry; abdomen distended almost to bursting; temperature 106.5, pulse too rapid and weak to accurately count. I promptly got it under the influence of that most reliable and efficient of all stimulants, nitro-glycerin, and then began the administration of alkalies. It began to respond to treatment at once, free evacuations of most offensive material soon taking place, followed by reduction in temperature and tympanites. Ten days later the child had practically recovered. In fact I have found that in all cases of acute intestinal trouble, even when profuse diarrhea is present, brisk cathartics afford the most prompt and certain relief. With them moderate doses of anodynes may be given, but not to the extent of inhibiting catharsis.

While on this subject permit me to invite attention to the great and decided efficacy of large quantities of alkalies in chronic digestive disorders. Particularly in those disturbances from which the users of tobacco and alcohol suffer, will this be found the case. To many such I have frequently given doses of one to two ounces of bicarbonate of sodium, fre-

quently repeated, not only with great and prompt relief to the induced trouble, but, in not a few instances, with at least a temporary overcoming of the causative trouble as well. As in nearly every case of digestive trouble there is a condition of hyperacidity of the gastric juice, is not the giving of alkalies the rational procedure? In fact is not the "requisite degree of acidity of the gastric juice" one of the numerous "bugbears" in the path toward "rational therapeutics"?

H. W. YEMANS, M.D.

Orrhotherapy in Diphtheria.

To the Editor:—The statistics for my paper on page 1, of this JOURNAL, were collected for me by Dr. Wm. R. Parkes, who had taken everything that could be found in my own journals and in the extensive files at the Newberry Library. It should be kept in mind by the reader that all statistics whether favorable or unfavorable to the use of antitoxin in diphtheria have been used and I have attempted to present an impartial statement. If I have failed to give the credit to antitoxin that many of my readers think is due, it is only because such credit is not borne out by the statistics and I beg the reader to make a careful analysis of the table. It should be specially observed that in nearly all statistics the comparison of the death rate in diphtheria has been made for the latter part of 1894 or for 1895 where antitoxin was used, with *previous* years when antitoxin was not used. As shown in observation 8 of the table Behring's statistics for Berlin prove that the death rate for diphtheria in 1895, whether antitoxin was used or not, was very much less than in previous years, it being only 14 per cent. in 4,479 cases treated in Berlin without antitoxin. If, therefore, statistics of all the patients treated with antitoxin in the latter part of 1894 or in 1895 could have been compared with those treated without antitoxin in the same period, it would appear from these statistics that the death rate in the latter would have been less than in the former.

Yours truly, J. FETCHER INGALS, M.D.

[Received after the article was in press.]

The Bracelin Remedy for Diphtheria.

[After all the talk in the newspapers on the subject, and elsewhere, we are sure our readers will gladly know that Dr. Bracelin is still in the ranks of the profession and repudiates the term "secret" as applied to his treatment.]—ED.

CHICAGO, ILL., June 29, 1896.

To the Editor:—Diphtheria, one of the most common and the most fatal of all acute infectious diseases from which the human family suffers, has been the *bête noire* of the medical profession.

For years investigators have been studying the disease so as to learn the cause which produces it, and, if possible, to discover a remedy which would remove the cause or modify or neutralize its effects, but without any satisfactory results. At length, after years of patient study and observation, two German scientists discovered that a certain kind of bacteria was invariably to be found in the diphtheritic deposit. They made known their discovery and now the Klebs-Löffler bacillus is looked upon as the specific cause of the disease. Since the discovery of microbic cause of the disease different antiseptics known to be destructive to bacteria have been used with varying degrees of success, but on the whole with unsatisfactory results.

Medical journals and daily newspapers were filled with reports of wonderful cures effected by the different methods of treatment adopted, yet the average death rate has remained about the same. The last aspirant for professional honors in the treatment of diphtheria, antitoxin, and most generally accepted by the profession as a successful remedy, does not appear to be so useful as it was at first believed it would be. Clinical tests as reported by some are favorable; as reported by others very unfavorable. According to some reports the death rate has been lowered, but others again show that there has been no appreciable lowering of the rate of mortality. So many authentic records of sudden deaths following immediately after it had been injected, and apparently caused by the remedy, as also the constitutional disturbances undoubtedly produced by it have made many of the profession halt in their advocacy of such a dangerous remedy, even if it had proved more successful in curing the disease than it has been, they feeling that it is not safe nor advisable to use such a dangerous remedy.

In my opinion diphtheria is a self-limited disease of specific origin. If, after the appearance of the disease, auto-infection can be prevented the efforts of nature will, unaided, effect a cure, but if the products of decomposition containing the specifie poison of the disease (whether we believe this to be the Klebs-Löffler bacillus or the ptomaines produced by it) are allowed to enter the circulation the disease increases in virulence, the powers of resistance are weakened and the victim dies.

Theorectically, a remedy to be successful in the treatment of diphtheria should be one which would be constitutional as well as local in effect. It should be destructive to the specific cause as found in the diphtheritic deposits, prevent decomposition of the diphtheritic membrane and destroy or prevent formation of the ptomaines which cause auto-infection. But before treatment has been commenced there may have been a greater amount of diphtheritic poison in the system than nature unaided is able to destroy. The remedy must therefore be a constitutional as well as a local one, so that entering the system it may assist nature in her efforts to destroy or neutralize the poison already there. Such a remedy would be an ideal one and should, in my opinion, meet the requirements necessary for the successful treatment of diphtheria.

In January, 1893, I discovered a remedy which appears to meet all the requirements of the ideal remedy. I have been experimenting with, testing clinically and improving on the original idea, until now I believe it is as near a specific for diphtheria as it is possible for a remedy to be for any disease. Since that time I have treated a large number of diphtheria cases in all stages of the disease and have only lost about one per cent., and I believe I have verified my theory that, if chlorin gas, corrected, should prove to be a safe bactericide for diphtheria, it would also be an effective remedy for all diseases of the respiratory organs of a microbic nature. This theory has been fully confirmed by the experience of many physicians beside myself who have used chlorin gas as prepared by me. It is too much to expect that such a small death rate can always be maintained, but I believe that by the use of this remedy the death rate will be less than 5 per cent. Not one who has used it as a prophylactic when exposed to the disease has been attacked by diphtheria. This is the best evidence of its efficiency as a prophylactic. As it is used by inhalation, it not only acts upon the diseased tissue locally, but being a vapor the remedial agent enters the lungs, passes into the circulation with the oxygen and materially aids nature in destroying the systemic poison. It is simple, easy to use, and absolutely safe; there is no danger of any harmful result following its use, or evil being caused by it. The remedy has been successfully used in a number of diseases of the throat and lungs, pneumonia, hay fever, asthma, laryngitis, common colds, bronchitis, whooping-cough, catarrh, consumption, etc. All cases of consumption in the first or second stages where it has been used, have recovered and are now well. Consumptive cases require, in addition to the inhalations, appropriate constitutional and supportive treatment on the usual lines. It has failed to cure in the last stages of the disease, but affords great relief to the sufferer. I have reason

to believe that if used on the first appearance of any symptoms of consumption that comparatively few will die of this much dreaded disease.

Pure drugs and careful manipulation in the process of manufacture are necessary in order to attain an efficient remedy. If made of poor materials, improperly combined, the remedy will prove a failure; but properly made it will prove to be all I claim for it. I have therefore made arrangements with a firm of reliable manufacturing chemists in Chicago to have it made under my personal supervision, and I have removed to this city for that purpose. Every bottle which now goes out will be guaranteed perfectly pure and of full strength. It will be distributed by Mr. J. J. Russell, 167 Dearborn St., Chicago, from whom the genuine remedy can always be procured. On every bottle will be found the formula and none will be genuine without my signature.

The remedy consists essentially of chlorin, deprived of its suffocating, irritating qualities by an emollient corrective. The value of the "corrective" is not so much due to the agents used as to the process of manufacture in making the combination. Properly made the results will be satisfactory, if improperly combined the results will be disappointing. This is the result of my repeated trials and clinical experiments carried on during a period of over three years. Two liquids are used, which are for convenience named "Bracelin Chlorin Bactericide," "No. One" and "No. Two." "B. C. B. No. 1" is set free by the corrected chlorin in "B. C. B. No. 2." "B. C. B. No. 2" is added to "B. C. B. No. 1" in the proportion of one to five parts slightly warmed and the vapor inhaled as directed. Some diseases, such as diphtheria and pneumonia, require its use once each hour, others but four or five times a day. I am now prepared to give my formula to the profession for trial in the teatment of diphtheria and throat and lung diseases, viz:

FORMULA OF BRACELIN'S CHLORIN BACTERICIDE.

Solution No. 1.

Solution Zinc chlorid	20 parts.
Solution Arsenic chlorid	30 parts.
Hydrochloric acid	1 part.
Water	49 parts.

Solution No. 2.

Solution chlorinated Soda, Standardized to 2.6 per cent. available.

Chlorin	70 parts.
Corrective	30 parts.

NOTE:—The corrective consists of menthol, camphor, eucalyptol and salicylate of methyl dissolved in alcohol and water. It will, I think, require no special argument to convince the profession that so chemically unstable a compound can only be prepared satisfactorily by careful and competent hands, and as already stated, I shall hereafter personally supervise its manufacture for the use of physicians.

P. M. BRACELIN, M.D.

PUBLIC HEALTH.

Yellow Fever at Rio Janeiro.—The *Revista de Ciencias Medicas* for May 20 states that there were 451 cases during the first fortnight of March, with 395 deaths.

An Expensive Investigation.—It was stated in the House of Commons last week that the total cost of the Vaccination Commission up to March 31 last, had been about $84,000.

Cholera in Egypt.—The *Progrès Médical*, June 6, states that the total number of cases of cholera reported that date is 3,030, of which 2,523 resulted fatally. Malta has announced a seven-day quarantine for ships from Egypt, extending it to twenty-one days if there are passengers on board.

Board of Health Summer Corps.—Fifty physicians, who will serve in the summer corps, were appointed by the Board of Health, of New York city at its meeting June 23. They are employed to attend to the sick in the poorer quarters and teach proper methods of sanitation. The announcement that the President of the Board of Health has selected forty rear tenements to be abated as nuisances shows that reform is at last becoming something more than a mere name in New York.

Deleti ab Variola.—The Berlin correspondent of the *Medical Press and Circular*, in his notes of the recent Jenner centennial celebration in Germany, records that Professor Virchow, who opened the proceedings in the name of the Committee of Honor, said, in his address, that as an ethnologist he was impelled to mention an ethnologic fact in the history of protective vaccination: "All the peoples that had not been reached by vaccination, or that had not accepted it had disappeared from the face of the earth—destroyed by the smallpox"—a statement which, if correctly quoted, must be subject to many exceptions.

Poison in Black Hair Dyes.—The *Journal D'Hygiène* of June 11, warns the public that several black hair dyes recently analyzed have been found to contain paraphenylenediamin, a derivative of the nitro-analins, which accounts for the serious eye troubles, boils and eczema which have been reported as following occasionally their application. The subject recalls the recent remark of an elderly Paris physician who was being rallied upon his youthful locks: "You young doctors drive us to dye our hair nowadays, as gray hairs no longer command respect."

The Use of Salts of Copper in the Manufacture of Canned Vegetables—Professor Duclaux states that the public should be warned of the dangers of using canned vegetables that have been colored artificially with salts of copper. The natural yellow color of cooked vegetables would be esthetic enough for most people if they knew that there was peril in the bright green ones. He urges hygienists to secure the passage of an ordinance announcing that while the salts of copper are not poisonous enough for the authorities to prohibit their use, still they affect some persons unpleasantly. Consequently the manufacturers must use them at their own risk and be responsible for damages, even when it is proved that the can contained no more copper than others which produced no bad effects.—*Semaine Médicale*, June 6.

Population of London in 1896.—The *Lancet*, June 6, has some of the preliminary statistics of the census held in London on March 29, 1896. The population then obtained by count, and since then adopted by the Registrar-General, was 4,435,955, or some 14,000 in excess of the estimate up for the middle of 1896. This error is so small that for statistic purposes it might well be disregarded. In Inner London, it was found that there was an actual decrease in the total population, chiefly caused by the absorption of old residential properties for business purposes and the removal of families to the suburbs. This is the first quiquennial census that has ever been taken in London, all other previous ones having been at intervals of ten years. It was authorized by special legislation matured in 1894.

Another Shrinkage in "Estimated" Population.—Even the city of London, it appears, has been over-estimating its population. The recent census shows some 15,000 less than the estimate formed on the basis of 1891. As pointed out by the *St. James Gazette* the difference is small, but important, as it shows that the previous fall in the rate of increase is maintained. The population is growing at a less and less rapid pace. At the beginning of the century it used to increase by more than 20 per cent. in the ten years between successive censuses; in 1881–1891 that rate had fallen to 10.4 per cent., the lowest on record; and now it is still less. The movement is not part of a general decline; it is peculiar to London, and seems to indicate that the huge overgrowth of the metropolis has begun to

cure itself. No town can go on growing indefinitely, and even London—monstrous as it is—has not fulfilled the expectations of earlier statisticians. Two hundred years ago it appeared to be growing so fast that Sir William Petty, one of the earliest pioneers in demographical research, reckoned that by 1840 the population would reach 10,000,000, supposing it to continue at the same rate. He thought however, that a natural limit would be reached before then, and placed it in the year 1890, by which time he calculated London would contain something over 5,000,000 inhabitants and the rest of England only 4,500,000. He was very nearly right about the total, which actually was about 9,000,000, but London accounted for less than one-half. Since then it has nearly reached its maximum, which, curiously enough, seems likely to prove a real natural limit. For the four years 1871–74 the average birth rate was 35.2; for the four years 1891–94 it was only 30.9. There has been a gradual and almost continual fall from year to year, which has not been counterbalanced by the simultaneous but slighter fall in the death rate from 22.7 to 19.9. Fewer people die in proportion to the population, but still fewer are born. This is explained by the increasing disinclination to marry. The marriage rates for the two periods contrasted are 19.6 and 17.3 respectively.

Bad Plumbing in New York.—The New York State Board of Health was, on June 15, in receipt of a complaint from the Board of Regents that the health of the 100 clerks, most of whom are young women, was endangered by the vile odors given off by the defective plumbing fixtures of the Capitol building. The Secretary of the Health Office, Dr. Smeltzer, is reported to have said that nothing can be done as there has been no money set aside for sanitary repairs by the late legislature. Incidentally, and in similar vein, complaints have been heard in even higher official circles, regarding the character of the plumbing work done in the government buildings belonging to the navy, at the navy yard and elsewhere. Cheapness of work has for a long time been the order of the day. Second-rate labor has, as a rule, been employed and light weight material has been put in; and there is no expert re-inspection to pass upon the work before the bills are passed.

July Suicides.—Commenting upon the fact—again emphasized by a recent "blue book"—that attempted suicides occur in July with far greater frequency than at the beginning or end of the year, *Hospital*, June 20, says it is a well known fact that in July in consequence of the great heat and the stagnant condition of the atmosphere, the physical vitality is generally very low and the depression of the nervous system has reached its deepest. No laboratory experiments are required to prove these contentions. Everybody is aware that in July he is for the most part "played out," and is looking forward to his annual holiday with eagerness. An important question is whether or not anything can be done to combat the natural depression of July. No doubt the earlier taking of the summer holiday would be a step in the right direction; only if this be taken at midsummer a further fortnight will be needed early in the fall, and that is costly in a double sense. The most practicable remedy, according to *Hospital*, July depression is a suitable nerve tonic; and perhaps the best and most easily obtainable of all nerve tonics for summer weather is the sluicing of the head and spine with cold water every day, or even twice a day. If any man who is disposed to commit suicide will give himself a preliminary shower bath, it is highly probable that he will change his mind before the "toweling" is finished.

No Shade for Greater New York.—At the first meeting in 1873 of the American Public Health Association, the president, Dr. Stephen Smith, read a paper on the "Effects of High Temperature upon the Public Health of New York and Measures of Prevention," in which he advocated the cultivation of shade trees in the streets, on the ground that they would tend to diminish the mortality caused by excessive heat, by affording protection from the direct rays of the sun; by preventing the paved surfaces from becoming heated; by enveloping the city with an immense evaporating surface which tends powerfully to cool the lower stratum of the air; by equalizing humidity; by the absorption of malarial emanations from the earth; by purifying the air in its absorption of gases deleterious to man and the emission of gases necessary to his existence. Twenty-three years later a society, called the Tree Planting Association of New York, is formed for this very purpose. But that ruthless iconoclast, the *New York Sun*, summarily squelches the project with the assertion that trees once abounded in New York streets "as they still abound in Brooklyn and other semi-rural towns, but they have succumbed to resistless forces, and it is hopeless to try and restore them without a radical remodeling of existing conditions." And so the denizen of the Greater New York, which will, of course, not be a "semi-rural town," may no longer do the Tityrus act—*sub tegmine fagi*—but must go abroad, even unto New Jersey for his shade trees.

Aftermath of the St. Louis Tornado.—Already, according to the *Medical Review*, the effects of the great tornado in St. Louis are beginning to show their influence upon the death rate, as foreshadowed in the JOURNAL of June 6. The *Review* says a number of deaths have been observed among young as well as old, in healthy and in sick individuals, where death was attributed to fear during and in consequence of the tornado. Several suicides have been reported "which to an extent were undoubtedly due to an intense disturbance of the *psyche* of the unfortunate individuals by the storm and its direct destructive consequences. The impression upon the nervous system of susceptible individuals will probably not be entirely wiped out for months or years, and the study of the nervous phenomena resulting therefrom will be interesting, profitable and instructive. Nor will the subject be exhausted by the resulting affections of the nervous system alone; but the direct effect of the storm upon the course of other ailments and diseases will be equally interesting to note." Dr. W. B. Outten, editor of the *Railway Surgeon*, proposes to study these phenomena and has sent a request to various physicians of the city to relate their experience as to nervous symptoms manifested by their patients in consequence of experiences in the tornado.

Smallpox in Texas.—Smallpox has been cropping out here and there in Texas within the recent past, having been introduced in the first place from New Orleans. It must be that there has been a relaxation of the usual vigilance of the health authorities of our sister State; smallpox ought not to get out. Instead of everybody shutting doors against an infection, the infection must be circumscribed and not allowed to escape; the order is reversed from the old days of shotgun; at least that's the way it is done in Texas. As soon as a case appears it is quarantined, and all who have been knowingly exposed are quarantined also. In that way there is usually very few secondary cases. But it got a good start in Smith county before it was discovered; and in all thirty-eight cases occurred. What we wished to call attention to, though, in this connection, was the remarkably small mortality. Only one death occurred out of thirty-eight cases treated, and that was in a man of seventy-five years of age—a case of hemorrhagic variety. Dr. D. H. Connally, the county physician of Smith county, deserves much credit for such successful treatment. The average death rate of smallpox is about 25 per cent.; at Camp Jenner, among the refugee negroes, it was nearly 30 per cent.; a fact attributable, no doubt, to the use of tents with two and three cases in each, and the sides pegged down. The Texas authorities do these things better; treat smallpox as nearly in the open air as possible—weather permitting. The scare is about over, however, now, the last cases reported being in

Liberty county; infection supposed to have been carried from Orange, where, we learn, the county physician employed a negro doctor to do what he ought to have done himself.—*Texas Medical Journal*, June, 1896.

Health Reports.—The following health reports have been received in the office of the Supervising Surgeon-General Marine-Hospital Service:

SMALLPOX—UNITED STATES.

Florida: Key West, June 25 to 29, 5 cases, 1 death; Pensacola, June 13 to 20 1 case.

SMALLPOX—FOREIGN.

Bombay, India, May 19 to 26, 17 deaths.
Calcutta, India, May 9 to 16, 3 deaths
Callao, Peru, May 17 to 31, 17 deaths.
Genoa, Italy, June 6 to 13, 3 cases.
Licata, Italy, May 31 to June 6, 3 deaths.
Madras, India, May 9 to 15, 2 deaths.
Madrid, Spain, June 6 to 13, 19 deaths.
Montevideo, Uruguay, May 16 to 23, 1 case.
Moscow, Russia, May 23 to June 6, 2 ases, 2 deaths.
Odessa, Russia, May 25 to June 6, 2 cases.
Prague, Bohemia, May 31 to June 6, 3 cases.
Rio de Janeiro, May 23 to 30, 1 case, 1 death.
Santiago, Cuba, June 6 to 20, 70 deaths. Smallpox epidemic here—over 900 cases existing on June 20.
St. Petersburg, Russia, May 31 to June 6, 16 cases, 5 deaths.
Tuxpan, Mexico, May 31 to June 13, 4 deaths.
Warsaw, Russia, May 31 to 6, 4 deaths.

CHOLERA.

Alexandria, Egypt, May 29 to June 3, 49 deaths.
Cairo, May 29 to June 3, 152 deaths. Other Egyptian towns June 3, 338 deaths. From beginning of epidemic to June 3, there have been 3,112 cases and 2,597 deaths in Egypt.
Bombay, India, May 19 to 26, 22 deaths.
Calcutta, India, May 9 to 16, 120 deaths.

YELLOW FEVER.

Brazil: Rio de Janeiro, May 23 to 30, 23 deaths.
Cuba: Cardenas, June 6 to 13, 3 cases, 1 death; Havana, June 13 to 20, 25 cases, 11 deaths; Sagua la Grande, June 6 to 13, 41 cases, 4 deaths; Santiago, June 6 to 20, 12 deaths.

NECROLOGY.

A TRIBUTE TO THE MEMORY OF DR. WM. ANDERSON.—At a regular meeting of the Indiana County (Pa.) Medical Society held May 12, 1896, Drs. James McMullen, Luther S. Clagelt and I. P. Klingensmith were appointed a committee to prepare a "Tribute to the Memory of Dr. Wm. Anderson" and forward a copy of the same for publication in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Dr. Wm. Anderson was born June 6, 1825, in Green Township, Pa. His parents immigrated to this country from County Derry, Ireland, in 1817 and settled in the eastern part of Indiana County where he passed his early life, working on the farm and attending at intervals the district schools. A higher course of instruction was entered upon at the Blairsville Academy and finished at a classical academy at Indiana. After two years of office study with Dr. James M. Taylor of Indiana, he entered October, 1850, the Jefferson Medical College, Philadelphia, graduating March 6, 1852, attending however a third course at his alma mater in 1868-69. On graduating he located at Indiana where he continued to reside until his death March 29, 1896, aged 70 years. His practice was general. He had been a member of the Indiana County Medical Society since its organization in 1858, and was its first secretary, its second president, and represented it at different times in the Medical Society of the State of Pennsylvania and in the AMERICAN MEDICAL ASSOCIATION. He had been a member of the State Society since 1862, was one of the vice-presidents in 1864 and the president in 1865. Since 1868 he has been a member of the AMERICAN MEDICAL ASSOCIATION and was a member of the International Medical Congress that met at Philadelphia in September, 1876; a member of the Ninth International Medical Congress which met at Washington, D. C., September, 1887, and also of the Pan-American Medical Congress which met at Washington, D. C., September, 1893. Several months before the date of his death, Dr. Anderson was seized with an attack of la grippe, which persistently clung to him and brought about his demise. He was connected with the United Presbyterian Church from youth. Being of a mild genial disposition everybody loved him and he had words of encouragement for all with whom he came in contact. He was noted for his industry in the societies and associations having for their object the free interchange of opinions on medical subjects. He was a frequent contributor to the medical literature of his day. Among his more notable productions are his monographs on Sclerosis of the Nerve Centers, Ozena, Nervous Diseases, Bacteria, Tobacco and Hygiene, in which much original research and thought is shown. The most valuable, perhaps, of Dr. Anderson's literary labors is entitled, "A Brief Biographical Sketch of the Medical Profession of Indiana County, Pa.," published in 1892. It contains 269 biographies.

In Dr. Anderson were happily combined calmness of manner with firmness of character, strictly honest with his patients and honorable with the members of his profession. His strict conscientiousness was one of his most marked characteristics.

THOMAS FERRIS COCK, M.D., of New York City, member of the AMERICAN MEDICAL ASSOCIATION since 1848, died June 11, at his country-place at Cold Spring Harbor, Long Island. He was a native of New York City, born there July 1, 1819. His father, Dr. Thomas Cock was for more than thirty years an officer, and part of the time president, of the College of Physicians and Surgeons, N. Y. He was graduated in arts from Haverford College; LL.D. at the same in 1886; M.D., at University of Pennsylvania in 1840. He settled in New York, and made obstetrics his special life-work. He was early a member in the New York County and State Medical Societies, and assisted in the formation of the Academy of Medicine and Pathologic Society. He served for a time at the Northern Dispensary. He was on the Visiting staff at Bellevue Hospital as early as 1849, going thence in 1855 to the city hospital, in whose service he remained at the time of his decease on the consulting staff. He was consulting physician at the asylum for Lying-in Women since 1841, and at the New York Infirmary for Women and Children since 1854, and at the State Hospital for women since 1855, about which year he issued his little manual of obstetrics. For the past ten years he had not been in active practice.

WALTER FISHER, M.D., assistant-surgeon and Captain U. S. A., died at Fort Meade, S. Dakota, June 8. He was at one time stationed at Fort Columbus, Governors Island, N. Y. His remains were interred at Oswego, N. Y.

THOMAS HUN, M.D., at Albany, N. Y., June 18, aged 88 years. In 1827 he entered the medical department of the University of Pennsylvania from which he graduated in 1830. He then returned to Albany and began practice. In 1833 he went to Paris to complete his education and remained six years. He returned in 1839 and accepted the professorship of the institute of medicine in the Albany Medical college.

HENRY SALZER, M.D., at Baltimore, Md., June 19, aged 55 years. He was born in Germany and educated in the Universities of Würzburg and Giessen, graduating at Giessen in 1866. He practiced in Germany about three years and then came to Baltimore, where he had since practiced.

LOUIS OCTAVE HUARD, M.D. (Tulane University Medical Department, New Orleans, La., 1857), at New Orleans, June 17, aged 67 years. He spent ten years in Paris, where he acquitted himself with highest honors, and was one of the few survivers of the famous French medical practitioners in Louisiana. Dr. Huard was honored with the red cross of Geneva for his devotion during the epidemic in France.

FRANK M. TEMPLE, M.D. (Western Reserve University Med-

ical Department, Cleveland, Ohio, 1880 and Department of Medicine of the University of Pennsylvania, Philadelphia, Pa., 1884) at Fairview, Pa., June 17, of pneumonia.——T. D. Kernan, M.D. (Department of Medicine University of Pennsylvania, Philadelphia, Pa., 1853) at Marion, Va., June 18.——George H. Calkins, M.D. (Northwestern University Medical School, Chicago, Ills., 1866) at Waupaca, Wis., June 25, aged 66 years.

PROF. P. STOLTZ. Sixteen years ago he retired from active life as an eminent obstetrician and instructor at Strasburg and Nancy, to the picturesque mountain village where he was born. He was so popular, however, that many patients followed him there, from all parts of the country, till his death last month at the age of 92. One of the addresses at the funeral was by a former pupil, whose father had also been Stoltz's pupil in his day.

SOCIETY NEWS.

The North Missouri Medical Association at its meeting in Moberly, Mo., June 17, elected the following officers: President, C. A. Jennings; First Vice-President, W. MacAllister; Second Vice-President, J. D. Brummel; Treasurer, Robert Haley; Recording Secretary, George N. Lance; Corresponding Secretary, G. O. Cupaidge; Executive Council, J. H. P. Baker, W. T. Lindley, C. P. Clapp, D. R. Stratton. The next meeting will be held in Moberly in June, 1897.

The Allegany County Medical Society at its annual session, held in Cumberland, Md., June 18, elected the following officers for the ensuing year: President, M. A. R. F. Carr, Cumberland; First Vice-President, C. C. Jacobs, Frostburg; Second Vice-President, E. T. Duke, Cumberland; Third Vice-President, S. A. Boucher, Barton; Secretary, H. W. Hodgson, Cumberland; Treasurer, W. J. Craigen, Cumberland.

The Maryland State Medical Society, at its annual meeting elected officers for the ensuing year as follows: President, N. D. Blake, of Martinsburg, Secretary of State Board of Health; Vice-Presidents, D. C. Louchery, of Clarksburg; W. W. Golden, of Elkins; L. D. Ruppert, of Nutallsburg, and H. B. Stout, of Parkersburg; Secretary, G. A. Aschman of Wheeling; Treasurer, J. W. Johnston of Davis.

The American Microscopical Society (formerly American Society of Microscopists).—The next meeting of the Society will be held at Pittsburg, Pa., August 18-20, 1896. The Society will be the first National Society to meet in the new Carnegie Library building. A preliminary program will be published on July 15, 1896, and the Society requests communications of anything new or interesting. The officers are: President, A. Clifford Mercer, Syracuse, N. Y.; Secretary, William C. Krauss, Buffalo, N. Y.; Treasurer, Magnus Pflaum, Pittsburg, Pa.

Mississippi Valley Medical Association, meeting at St. Paul, Minn., Oct. 20, 21, 22, 23, 1896. H. O. Walker, President, Detroit, Mich.; Merrill B. Ricketts, First Vice-President, Cincinnati, Ohio; William F. Barclay, Second Vice-President, Pittsburg, Pa.; H. W. Loeb, Secretary, 3559 Olive Street, St. Louis, Mo.; Harold N. Moyer, Treasurer, Chicago, Ill. C. A. Wheaton, Chairman Committee of Arrangements, St. Paul, Minn. Executive Committee: Wm. N. Wishard, Indianapolis; X. C. Scott, Cleveland; Geo. J. Cook, Indianapolis; J. M. Mathews, Louisville; I. N. Love, St. Louis; A. M. Owen, Evansville; Wm. T. Belfield, Chicago; C. S. Cole, New York; C. A. L. Reed, Cincinnati; R. Stansbury Sutton, Pittsburg.

Colorado State Medical Society.—This Society held its annual meeting at Denver, Colo., June 16, 17, 18, I. B. Perkins, President, in the chair. Dr. Perkins in his address spoke briefly of the progress that had been made in bacteriology and of the success that had been met with in the use of antitoxin. The speaker expressed his regret that more success had not been met with in their efforts to have a national sanitarium established in Colorado and urged the committee to continue their work in that line. Among the papers read were the following: "Bicycle Hernia," Geo. W. Miel; "A Rapid Method of Castration," W. P. Munn; "Radical Operation for Inguinal Hernia," W. W. Grant; 'Symphysiotomy," T. Mitchell Burns; "The Management of Puerperal Sepsis," W. A. Jayne; "Supernumerary Oviducts and Typical Hydatid of Morgagni, with a Large Fibroid Uterine Tumor—Hysterectomy," H. G. Wetherill; "The Diagnosis of Tumor of the Brain," J. T. Eskridge. The following officers were elected for the ensuing year: Robert B. Levy, President; H. R. Bull, First Vice-President; Dr. Finney, Second Vice-President; S. D. Van Meter, Third Vice-President; H. R. Whitney, Corresponding Secretary; Laura Liebhardt, Recording Secretary; W. F. McClelland, Treasurer. The various standing committees were reappointed.

The Northern "Tri-State" Medical Association will hold its annual session at Algola, Ind., July 21. The following papers will be read: "The Need of Abdominal Section as an Aid to the General Practitioner to Diagnose Obscure Abdominal Troubles," J. H. Carstens, Detroit, Mich.; "Salicylate of Sodium in Septic Conditions," Hugo O. Pantzer, Indianapolis, Ind.; "Modern Brain Operations," Allen DeVilbiss, Toledo, Ohio; "Some Considerations in the Treatment of Acute Otitis Media," E. A. Bulson, Ft. Wayne, Ind.; "Embryonic Miscarriage," J. R. Dodge, Hudson, Mich.; "Management of Vesical Calculus," F. J. Hodges, Anderson, Ind.; "The Cause and Treatment of Color-Blindness," F. C. Mayson, Hillsdale, Mich.; "Purpura Hemorrhagica," Frank M. Guyer, Hillsdale, Mich.; "The Differential Diagnosis of Insanity," C. B. Burr, Flint, Mich.; "Diffuse Cellulitis of Hand and Forearm," W. W. Brand, Toledo, Ohio; "A Case of Brain Tumor, with Exhibition of Specimens," G. W. McCaskey, Ft. Wayne, Ind.; "Asepsis and Antisepsis—Which or Both," J. B. Greene, Mishawaka, Ind.; "Aseptic Technique in Pelvic and Abdominal Operations Outside of Hospitals," C. N. Smith, Toledo, Ohio; "Conservative Surgery in Tuberculosis of the Testicle," J. B. Murphy, Chicago, Ill.; "The Differential Diagnosis of Insanity," C. B. Burr, Flint, Mich.; "A Case of Brain Tumor, with Exhibition of Specimen," G. W. McCaskey, Ft. Wayne, Ind.; "Obstruction of the Bowels," Hal C. Wyman, Detroit, Mich.; "Diagnosis of Typhoid Fever," W. C. Chapman, Toledo, Ohio.

The Minnesota State Medical Society held its twenty-eighth annual meeting at Minneapolis June 17, 18 and 19, Dr. Frank Allport, Minneapolis, President. There was a large attendance and much enthusiasm was evinced. President Allport in his address referred to the present coroner system as a relic and of no use.

The Society adopted the following resolutions concerning anti-vivisection:

WHEREAS, Science within recent years has received untold benefit and has made phenomenal progress from the legitimate practice of vivisection; and

WHEREAS, Humanity has profited and is destined to profit immeasurably by the discoveries in physiology, pathology and bacteriology which have been made possible by the scientific use of living animals; and

WHEREAS, Certain organizations, self-styled anti-vivisectionists, inspired by motives more sentimental than sound, with minds moved by emotional influences and hysterical arguments rather than by scientific facts, are seeking to strike a blow at the interest of science by the introduction into the Congress of the United States a bill restricting or abolishing vivisection in the District of Columbia; and

WHEREAS, The introduction of this measure is but a step preparatory to the presentation of other and similar measures in our State legislatures; therefore, be it

Resolved, That this Society denounces such attempted legislation as mischievous to the medical profession, as suicidal to the interests of society, as destructive to science, and as per-

versive of those moral standards which maintain a true relationship of things;

Resolved, That this Society petitions the senators and representatives of this State in Congress to use their utmost efforts for the defeat of this obnoxious measure.

It was decided to hold the next annual meeting at Mankato. Officers were elected as follows: President, W. D. Flynn of Redwood Falls; First Vice-President, David O. Thomas, Minneapolis; Second Vice-President, D. M. Jones, Gaylor; Third Vice-President, Dr. Williams, Lake City; Secretary, Ignatius Donnelly, St. Paul, re-elected; Treasurer, R. J. Hill, Minneapolis, re-elected; Censors, W. W. Mayo, Rochester, and Franklin Staples, Stillwater.

The Association of Surgeons of the Louisville, New Albany and Chicago Railway System held a meeting at West Baden Springs, June 4. Seventeen surgeons employed by the company were present. Dr. John G. Davis was elected president, Dr. Dudley S. Reynolds, vice-president and Dr. Samuel L. Ensminger, secretary and treasurer. Dr. George F. Beasley of Lafayette reported the case of a youth who had compound fracture of the frontal bone, with loss of bone and extensive injury to soft parts two years ago and recently became epileptic. Pulsation could be felt over the point of injury and pressure caused pain. On making incision and raising the parts covering the opening in the cranium he found the soft parts all intimately connected in a cicatricial mass and adherent to the brain integument. Occipito-frontalis muscle fascia, dura and pia mater firmly united and cicatrized. The bony edges of the opening were irregular and thickened with nodulated growths turned inward pressing on the brain. He carefully separated the brain from the adherent cicatrix, removed the exostoses and used gold foil as a covering for the brain and to prevent union again with the cicatrix. The operation was performed under strict antiseptic rules and succeeded so well that at the time the Doctor reported the case, about two weeks subsequently, there had been no more epilepsy, and the wound had healed without discharge of any kind and the patient was in a manner well.

Dr. Dudley S. Reynolds of Louisville briefly recited the case of a negro boy, 16 years of age, who had frontal headache and was suddenly seized with edema of the eyelids and the left side of the face. The eyes did not seem to protrude from the orbit, although the edema was such as to firmly close the lids. Examination of the left nasal passage showed exudation of pus at the anterior extremity of the middle turbinate. Careful examination of the locality from whence the pus came, with the symptoms already described led him to suspect abscess of the frontal cells. Using a bone drill 4 millimeters in diameter, an opening was made at the external anterior attachment of the middle turbinate, when a large quantity of offensive, cream-colored pus escaped. The cavity was injected with a solution of bichlorid of mercury and chlorid of sodium. The next day the edema had disappeared from the face and the eyelids were opened by the voluntary efforts of the patient, though still somewhat swollen. He had Hutchinson's teeth, and was given 10 grains iodid of potassium every four hours. He appeared at the clinic irregularly for about three weeks and was then lost sight of. Four months later he returned with a tender swelling at the base of the nose. On discovering fluctuation an incision was made, followed by the discharge of a large quantity of cream-colored pus and a sequestrum of bone of irregular outline about one-eighth of an inch thick in its heaviest portion; about three-fourths of an inch in length and between three-eighths and one-half inch wide. This was removed, the incision enlarged and the cavity freely washed with the bichlorid solution. He was cautioned about the necessity of taking the iodid, which had been abandoned. The wound continued to discharge for about six weeks, when a uniform depression of the whole extent of the left half of the frontal bone came on. He has no bony projection of the brow, owing to the loss of the supra-orbital process; but has recently begun to suffer with epilepsy and it is supposed that cicatricial changes in the meninges at the site of the abscess may account for the epilepsy.

The report and discussion of cases engaged the attention of the Association until the close of the session. The meeting was one of unusual interest and profit to all present. The Association will hold its next meeting at Cedar Lake, July 8-9, 1897.

The Ohio State Medical Society and Anti-Vivisection Legislation.—James E. Pilcher, M.D., Ph.D., Captain in the Medical Department of the United States Army, Professor of Military Surgery in the Ohio Medical University, in his remarks before the fifty-first annual meeting of the Ohio State Medical Society, May 27, 1896, said: Humanity is fallible. The most striking example is the existence of the absurd anti-vivisection movement, which has attained an unreasonable prominence through the success of its advocates in getting before the United States Senate a measure directed against vivisection, under the misleading title of "A bill for the further prevention of cruelty to animals in the District of Columbia." This movement of the self-styled anti-vivisectionists has gathered so much momentum in its misdirected career of misrepresentation that the medical profession must, in self-defense, take a decided stand for the preservation of its own liberties and the best interest of suffering humanity. There is no profession in which humanity is so much a part of the daily life of its practitioners as medicine. The absurdity of placing such persons in the attitude of defense against an accusation of cruelty or inhumanity of any kind is evident to every one.

The most rabid anti-vivisectionist will masticate his cutlet of veal or his shoulder of lamb, all regardless of the joyous young life that has been rudely terminated merely to gratify the animal appetite of the alleged defender of our dumb animals. The sportsman inflicts untold agony upon the victims of his prowess, but we hear of no movement looking to the prohibition of hunting. The anti-vivisectionist nestles luxuriously in his furs and his wife waxes gorgeous in her headgear garnished with the plunder of feathered songsters—both the spoil of the rapacity and cruelty of man; while the shoe trade, based entirely upon the products of the death of millions of God's most harmless creatures, is prosperous in the extreme.

When the anti-vivisectionist becomes a strict vegetarian: when he avoids all amusements resulting from animal slavery or suffering; when he clothes himself entirely in garments of vegetable and mineral composition; when he suppresses all practices, sportive and mercenary, by which pain is inflicted upon animals, he may properly begin to inquire into vivisection with a view to ascertaining whether it is humanitarian or cruel. In the war of the rebellion, 3,273 out of 3,717 cases of wounds of the intestines were fatal. It was demonstrated a few years ago by experiments on dogs that abdominal section and intestinal suture in such cases was a feasible and successful operation, and the operative procedure was experimentally elaborated, so that by it the mortality in gunshot wounds of the intestines has been reduced from 90 down to 10 per cent. The brain, which as well as the abdomen, was formerly regarded as forbidden ground to the surgeon, has, by the vivisection experiments of Ferrier and others, been brought within the realm of curative art. The work of Aristotle, Realdus Columbus, Andreas Cæsalpinus, William Harvey, and Marcello Malphigi in discovering the circulation of the blood was entirely conducted by experiments upon lower animals. The experiments of Vesalius, Hooke and Lower gave us artificial respiration. Transfusion of blood was directly the offspring of vivisectional experiment. The entire system of antiseptic and aseptic surgery, the greatest humanitarian triumph in the world's history, is based upon the practice of vivisection. The bacillus of anthrax, the bacterium of tubercle, the micro-

organism of diphtheria, the spirillum of relapsing fever, the streptococcus of erysipelas and puerperal fever, and many other specific agents in disease have been discovered entirely through experiments upon lower animals. The antitoxin treatment of diphtheria, the Pasteur inoculation cure of hydrophobia, the prevention of smallpox by vaccination, and many others of the most important therapeutic procedures of modern medicine are due to vivisection, while still many more are the subjects of observation, which will ultimately result in the discovery of curative procedures.

While vivisection experiments are always beneficial they are never cruel. Even were the medical student the heartless creature represented by the anti-vivisectionists, he would prefer, for his own convenience, to silence the cries and subdue the struggles of his subjects by an anesthetic. All this emphasizes the deceptive and incorrect character of the efforts to embarrass, if not prohibit, the future of these genuinely philanthropic as well as scientific studies. The dangerous movement looking to this end, initiated in the District of Columbia, has met with astounding success, and it behooves all true lovers of scientific progress to unite in the attempt to prevent the enactment of the bill now before the United States Senate for this purpose; for, should this movement be successful in the District, it would not only put an end to most important work in various scientific departments of the government and the medical schools of Washington, but it would be the beginning of a movement jeopardizing scientific study throughout the entire Union.

The Ohio State Medical Society adopted the following resolutions:

Resolved, That the Ohio State Medical Society earnestly joins in the protest of the American Medical Association as expressed in the resolutions adopted at the recent meeting of that representative body of American physicians and surgeons held in the city of Atlanta.

Resolved, That a copy of these resolutions be sent to the Senators and Representatives of the State of Ohio in the Congress of the United States, and that they are hereby requested to use their influence in opposition to the proposed legislation, "unless it shall first be shown by an impartial investigation that cruel and unnecessary experiments are being performed in the District of Columbia, and that existing laws do not provide suitable punishment for cruelty to domestic animals."

The following amendment, proposed by Dr. L. B. Tuckerman, of Cleveland, was accepted by Dr. Pilcher, and the resolutions as amended were unanimously adopted:

Resolved, That a delegate be appointed by this society to go to Washington and interview the Senators and Representatives in person in behalf of these resolutions, and that one hundred dollars be appropriated to pay his expenses.

MISCELLANY.

Ivy Poison.—Recent experiments show that the poison of the poison ivy is a volatile oil. Hence, water will not remove the poison from the surface as well as alcohol.

Disturbed Equilibrium.—"Isn't that too much mustard for so little meat?" exclaimed Charles Lamb as he noted the approach of the plaster.

Argon in the Breath.—Kellas concludes from his experiments that exhaled air contains more argon than before inhalation: from this he infers that it is an important element in the animal economy.

Dr. J. H. Kellogg, of the Battle Creek Sanitarium, formally opened and dedicated the Workingmen's Home and Medical Sanitarium in Chicago, June 28. Addresses were made by Dr. Bayard Holmes and others.

Physical Degeneration in Italy.—A Milanese writer asserts that 45 per cent. of the young men of Italy are unable to enter the military service on account of their lack of the physical requirements.—*Revista de Ciencias Medicas*, May 20.

His Consolation.—It is related of the late Professor Sappey, who was far from being an orator, that he used to console himself with the remark that his diffidence in speaking only caused suffering to himself alone, while the fluency of some physicians causes countless others to suffer.—*Journ. de Méd. de Paris*, June 7.

Not Chemicals.—The supreme court of Louisiana is of the opinion that soda, seltz and similar drinks are not chemicals, and it holds, in the case of the Crescent City Seltz and Mineral Water Co. v. City of New Orleans, April 6, 1896, that the making of soda, seltz and similar drinks is not the manufacturing of chemicals, within the constitutional exemption of that State of property employed in manufacturing chemicals.

A Rare Effect of Tobacco.—J. W. Scott, M.D., reports a case of convulsions, epileptiform in character, due to the use of tobacco. For two months he had one or two convulsions a week and they were growing progressi vely worse in spite of treatment. With the discontinuance of tobacco the convulsions ceased and have not returned.—*Southwestern Medical Record.*

Correction.—In issue of June 20, it was stated that "Dr. Curran Pope will lecture upon Diseases of the Mind and Nervous System; Dr. Pope resigns from the Hospital College of Medicine where he held the same position as the one in the Louisville School." This is an error, as he now holds a regular full professorship in the Louisville Medical College.

A Cockade and Crests Preferred!—The subjoined advertisement appears under "special" in the *Glasgow Evening News*. It is too good to be buried in the columns of a daily newspaper: "Doctor's Cockade.—Wanted from Cab Owners, by Doctor who has recently become surgeon in a Volunteer Regiment, estimates for hire of a Brougham three hours a day; driver must wear a Cockade: Brougham with one or two crests on doors preferred. Apply No. 10,737, News Office."

The Treatment of Cystitis.—L. Grant Baldwin, M.D., says; "Having excluded in the diagnosis, as causative factors, new growths, foreign bodies and tuberculosis, if the case is an acute one, example an operative case where a catheter has been used in an uncleanly manner, I have found that relief can be obtained in twelve hours and often in a much shorter time by the administration of sandalwood oil, together with benzoic acid, and a cure is practically obtained in from two days to a week."—*Brooklyn Medical Journal*, June, 1896.

Latent Gonorrhea.—Dr. Rosenwasser says of the gonococcus of Neisser: The locations of choice are the urethra and vaginal portion of the cervix. A person may in time become accustomed to his own brood of germs so that they cease giving trouble. Transplant them to new soil and they at once effect the recipient with pristine vigor. Then if these regenerated germs are returned to the original owner they will initiate as vicious action as though they had never been there before. This is his explanation of "latent" and "recurrent" gonorrhea. —*Cleveland Medical Gazette*, June, 1896.

International Bacteriologic "Concours."—As a memorial to Pasteur, the *Circulo Médico Argentino* of Buenos Aires, offers prizes of $400 and $200 for the best original and unpublished bacteriologic investigations or studies reported to the President, Senor Gregorio Aroaz Alfaro, before May 31, 1897. The reports to be in Spanish or French. For further particulars see the *Crónico Médica* of Lima, April 15.

Improved Eye Glasses for School Children and Artisans.—The *Revue Gén. d'Ophtalmologie* for May, describes some spectacles for school children which have a celluloid trap cover for each glass that falls down over them whenever the head droops forward, and springs back into place as soon as the head is held upright. The other is a working glass for cases of excessive myopia. It is a metal plate pierced with stenopeic openings in

the direction of the twelve principal meridians, radiating from around the pupil. It improves the sight to such an extent that myopia of 10 D. is corrected to 1 and —4 D. It also proves useful in irregular astigmatism.

The Academie de Medecine of Paris.—At the session of the Académie held June 9, M. Roux was named as a member *vice* M. Pasteur deceased. At the same session Dr. Marcel Baudoin in the name of the Medical Press Association of France, M. Cornil, President, asked the Académie to become represented at the Fête to celebrate the fiftieth anniversary of the discovery of anesthesia. This fête will be held on the occasion of the meeting of the French Congress of Surgery in October next. In response the Académie has designated M. Cornil as its representative on that occasion.

Serum Treatment of Diphtheria in Cracow.—Dr. Stapa has presented to the Cracow Medical Society a report of the results obtained by the serum treatment of diphtheria in the Children's Hospital of that city. During the year 1895 the number of children subjected to it was 258. Of these the mortality was 22 per cent. This compares very favorably with the mortality in the ten previous years, which was as high as 56.3 per cent., there being 709 deaths out of a total of 1,354 patients who were treated by other methods. Laryngeal croup occurred in 165 cases, and a rash having the appearance of scarlet fever and lasting from two to sixteen days in fifty-eight cases. It was noticed that certain samples always produced rash. No effect on the occurrence of albuminuria by the serum could be shown.

Parenchymatous Goitre Treated with Hypodermic Injections of Durante's Solution of Iodo-Iodid.—Reyes, of Palermo, has treated twenty-eight cases of parenchymatous goitre in this way, and the goitre rapidly subsided in size, the general health visibly improved, the patient gained in weight, while there were none of the unfavorable results that sometimes occur with thyroid medication. The formula used was that proposed by Professor Durante, of Rome, for tuberculosis, "solution iodo-iodurée," given in the *Semaine Médicale*, 1894, p. 252. At first two injections of two to five grams each were made during the week, then one, and later one in two weeks.—*Semaine Médicale*, May 13.

Substitute for Yellow Phosphorus in the Manufacture of Matches.—Gurowitz announced at the meeting of the K. K. Ges. der Aerzte of Vienna, May 15, that he had discovered a substitute for the dangerous yellow phosphorus in matches, which is perfectly harmless, is easily applied to wooden and wax matches, lights on any rough surface, and has a very high self-lighting point, 150 to 160 degrees C. It is made by melting together pulverized without danger and the other ingredients are entirely sulphur and red phosphorus; the substance thus formed can be harmless. The members of the board of health were so pleased with their investigation of it that they at once petitioned the government to forbid henceforth the use of the poisonous phosphorus altogether.—*Wiener klin. Rundschau*, May 24.

Medical Appropriations by the Fifty-Second Congress.—An act of Congress (No. 213) making appropriation for sundry civil expenses for the year ending June 30, 1897, appropriates the following sums for the purposes named: For preservation and repair of buildings, etc., at U. S. Marine Hospital and Quarantine Stations, $30,000; special for Marine Hospital at Boston, Mass., $1,850; at Chicago, Ill., $8,950; at Cincinnati, Ohio, $1,000; at Detroit, Mich., $1,300; at Louisville, Ky., $1,500; at New Orleans, La., $2,150; at Port Townsend, Wash., $6,150; at San Francisco, Cal., $300; at St. Louis, Mo., $1,860; at Wilmington, N. C., $1,200; at Vineyard Haven, Mass., $1,500. Special Quarantine Stations at Reedy Island, Del., $1,200; at Brunswick, Ga., $800; at Gulf, $350; at South Atlantic, $15,750; at San Diego, Cal., $350; at San Francisco, Cal., $5,000; at Port Townsend, Wash., $3,500. Ordinary expenses of the quarantine service, including pay of officers and employes, $131,000; Government Hospital for the Insane, Washington, D. C., $293,851; Garfield Memorial Hospital, Washington, D. C., $19,000; Providence Hospital, Washington, D. C., $19,000. For pay of surgeons, attendants, and other expenses of the hospitals at the National Homes for Disabled Soldiers at Dayton, Ohio, $55,000; at Milwaukee, Wis., $28,000; at Togus, Me., $25,800; at Hampton, Va., $30,000; at Leavenworth, Kan., $30,000; at Santa Monica, Cal., $20,000; at Marion, Ind., $24,000. Hospital at Leavenworth (Kansas) prison, $28,000. Index catalogue of the library of the Surgeon-General's office, $12,000. The President is also authorized in case of epidemics of cholera, etc., to use the unexpended balance of appropriation of March 2, 1895, in aid of State and local boards of health, or otherwise in suppressing the spread of the same.

The Harvard Medical Alumni Association held its sixth annual banquet at Boston, Mass., June 23. The meeting was of unusual interest because of the presence of Theobald Smith, M.D., pathologist of the Massachusetts Board of Health and the new professor of comparative pathology in the Harvard Medical School. Dr. George B. Shattuck, President of the Association presided and opened the post-prandial exercises. He said the Association now numbered 1,321 members, seventy-six having joined since June 1, 1896. He continued: "I can not, as your president, refrain from all mention of this very generous, useful and intelligent endowment in the medical school. Let me read you the text of the donor's deed of gift that you may know just what his wishes and objects were in creating this foundation. 'It is my wish to testify to my deep interest in the advancement of medical science and the higher medical education; an interest originating in the fact that my father was a physician. I therefore offer to the President and Fellows of Harvard college the sum of $100,000 in cash, payable July 1, 1896, as a fund for the endowment of a professorship of comparative pathology in the medical department of Harvard University. I desire that this fund shall be forever known as the —— fund, in memory of my father, —— M.D.,[1] and that the professorship shall also bear his name. It is furthermore my wish that the income of the fund shall be applied first to the payment of the salary of the —— professor of comparative pathology, who shall also be a member of the medical faculty and appointed to office in the same manner as are other professors in that body, and who shall devote his time to the duties of his professorship, not engaging in private practice without the recommendation of the medical faculty and consent of the President and Fellows.'" Dr. Theobald Smith was introduced. He read a technical paper on "Comparative Pathology in Its Relation to Human Medicine." In conclusion he said he considered it most advisable for the members of the medical profession to take a more active interest in public affairs. The following officers were elected: Dr. Shattuck, President, and Dr. Walter Ela, Secretary, now occupying office for a three years' term; Vice-Presidents, Drs. Gustavus L. Simmons, Sacramento, Cal.; William W. Seymour, Troy, N. Y.; John W. Parsons, Portsmouth, N. H.; Alternate Vice-President, Dr. Thomas W. Huntindon, Sacramento; Secretary, Augustus Thorndike, Boston; Councillors for term ending 1900, Lincoln R. Stone, Newton; J. T. G. Nichols, Cambridge; Robert W. Lovett, Boston.

Wanted—Improved Pocket Cuspidors.—The *Journal de Méd. et de Chir.* for May, asks why it is not possible to educate the public until every one with even a catarrhal cold or influenza will no more think of leaving the house without his pocket expectorator than he would go without his handkerchief. Invalids who have learned to use the portable cuspidors of a sanitarium are never content without one afterward. But their

[1] The name of the donor was withheld at his request.

comparatively high price, $1.60, and the difficulty of procuring them, has prevented their general adoption. Only one store in Paris was found where they were for sale. Something cheap, light and inconspicuous is needed, and there is a fortune waiting for the inventor who will provide something that will find favor in the eyes of an expectorating world, and be the means of saving the lives of thousands yet unborn. The sanitary spit mugs now in use in some hospitals, although ornamental and useful, are scarcely attractive enough for the general public.

Two New Parasitic Cutaneous Diseases in Russia.—Recent numbers of *Wratsch* (48, 52, 3) contain descriptions of a skin disease produced by the larva of a fly (Gastrophilus hemorrhoidalis L. or G. pecorum Fb.) which prevails in the provinces near the Volga. Exposed places, the face, hands and neck, are affected in lines, 15 cm. long, resembling the scratch of a needle, and in each is found the 1 mm. long larva. The hair of the skin is frequently covered with the eggs, which wash off easily, so that only a few of the larvæ find their way under the skin. One writer has found the lesions in the mouth, nose and beneath the conjunctiva. The disease resembles Neumann's "creeping eruption." In the province of Twer there is still another parasite that affects the skin, a still undescribed filaria several inches long. It burrows in the hand, producing a boil, and resulting sometimes in extensive inflammation, anchylosis and even gangrene of separate fingers.—*Centralblatt f. Chirurgie*, May 23.

Practical Notes.

Optic Atrophy.—Dr. Culbertson recommends glonoin in conjunction with strychnin, in all forms of optic atrophy, retinitis pigmentosa, hereditary atrophy, atrophic choroiditis and all the toxic amblyopias. Dose, 1-50 grain given internally.—*Am. Jour. of Ophthalmology*, June, 1896.

Erysipelas and its Treatment.—Dr. Bedford Brown says (*New England Medical Monthly*, June, 1896) symptoms usually attributed to inflammation of the brain are probably due to blood poisoning from the ptomaines of the streptococcus, after having been rapidly absorbed and transmitted throughout the circulation.

Treatment of Menstrual Nervous Troubles with Ingestion of Ovarian Tissue.—Landau stated at the meeting of the Berlin Medical Association, June 3, that he had been administering ovarian tissue from animals to patients suffering from the nervous disturbances caused by the suppression of the menses after extirpation of the uterus or its annexes, or the menopause. In each case it had been followed by the disappearance of the nervous troubles, at least temporarily.—Reported in the *Semaine Médicale* of June 10.

Pseudo-Erysipelas after the Instillation of 1-120 Grain of Atropin.—H. McI. Morton, M.D., reports a case: The infiltration of both upper and lower lids was so great that the oculo-orbital and oculo-malar sulci were completely obliterated, and the cheeks were intensely swollen to the angles of the mouth. There was much pain of a severe, burning character. The great amount of infiltration and the redness looked not unlike rhus poisoning. The patient has not been out of the house, however, and the relation of cause and effect was too marked to permit of any doubt as to the cause of the trouble. The trouble disappeared in a few days, under cold compresses, and a solution of lead, water and laudanum.—*Annals of Ophthalmology and Otology*, June, 1896.

Plenge's Method of Hardening with Formaldehyde and Making Frozen Sections for Rapid Diagnosis.—1. A piece of the tissue as thin as possible is hardened in a 4 per cent. solution of formaldehyde for one-half to one hour, or longer if thick. 2. The frozen sections are made with Jung's lever microtome. 3. They are taken up in water which has been boiled to expel the air, or better, in 50 per cent. alcohol. 4. They are stained with the analin dyes. 5. They are rinsed with water, alcohol, oil or Canada balsam. This method is used with admirable results at the Heidelberg Path.-Anat. Institute. It is not adapted, however, to normal placentæ, pure fatty tissues, solid bones, bone marrow, papillary tumors, normal testes and the small intestines, nor to normal lung tissue which is difficult to treat in this way.—*Centralbl. f. Chir.*, April 25, from *Munch. Med. Woch.*, No. 4.

Extensive Resections for Tuberculosis of the Foot and Wrist.—Bardenheuer and Wolff substitute extensive resections for amputations in a large proportion of cases of tuberculosis of the foot and wrist. Their method of resecting the wrist insures a much more solid union between the metacarpal bones and the bone of the forearm than is the case with the usual methods. They cut the upper end of the metacarpal bones in the shape of a wedge, with a wedge-shaped surface to correspond on the end of the bone of the forearm. This secures an exceedingly close and secure junction and a strong bony anchylosis is formed, which is much to be preferred to a movable joint with nothing to support it. They have performed the operation eight times with complete success in each.—From the "Chirurgencongress," in the *Semaine Médicale*, June 6.

An Ideal Excipient for Ophthalmic Unguents.—Dr. Allen Jamieson of Edinburgh reports in the *British Journal of Dermatology*, April, the following combination as an ideal ophthalmic salve: Lanolin (Liebreich), 3 drams; almond oil, ½ dram; distilled water, ½ dram. Mix. If smeared thinly on the lids this occasions no unpleasantness, and it may be employed when it is desirable to use a salve to prevent the lids becoming glued together by an increase of the lachrymal secretion. It is, however, better as a rule to add a couple of grains of boric acid to correct any slight tendency to rancidity, though this is not prone to happen, even if the ointment be kept for a time. In eczema of the lips the salve forms an excellent medium for the yellow oxid of mercury so beneficial in such conditions. Two grains may be added to the half ounce. According to the testimony of patients, the salve gives a pleasant sensation of coolness without trace of smarting or irritation. Its curative influence, the author says, is equal if not superior to that of any other eye salve prepared with other bases.

Some Common Affections of the Heart and Their Treatment.—Dr. H. W. Rogers says: In regard to those cases considered purely functional, it may be a question whether many of them do not initiate the more serious lesions found later in life. Usually no murmurs are found on auscultation, but almost invariably a marked accentuation of the second sound at the aortic orifice which means loss of elasticity in the aorta. There are few conditions of the pulse pathognomonic of a particular cardiac lesion. The nervous mechanism plays an important part in its modification. In most cases, however, a rapid pulse means a weak myocardium. A slow pulse, on the contrary, means a heart which is overburdened by some form of resistance in the circulation, but a myocardium which in most instances is essentially strong. Of the diet he says: Limitation of starchy foods and sweets and the employment of rapidly appropriated proteids is the general plan. Digitalis he considers the ideal heart tonic. Strychnin is one of the most potent remedies, but its action is rapid and there is danger if used too frequently or too long. No better combination than morphin, strychnin and nitro-glycerin can be employed in acute attacks, especially those designated as angina pectoris.—*Cleveland Journal of Medicine*, June, 1896.

Hospitals.

METROPOLITAN THROAT HOSPITAL, NEW YORK.—The 29th annual report shows the number of new patients who received treatment at the hospital during the year was 2,286, and 610

surgical operations were performed. Dr. Clinton Wagner is medical superintendent.

APPOINTMENT.—Dr. J. Clement Clark has been appointed by the board of directors first assistant physician of the Maryland Hospital for the Insane at Spring Grove, Md., to succeed Dr. J. Percy Wade, who has been made superintendent.

INFANTS' SUMMER HOSPITAL.—The formal opening of the Infants' Summer Hospital at Ontario Beach, Rochester, N. Y., took place June 23. This is its tenth season of beneficent work.

Philadelphia.

DR. A. C. ABBOTT has been elected professor of hygiene in the faculty of the University of Pennsylvania, to succeed Dr. John S. Billings, resigned.

DR. JOSEPH MCFARLAND has been elected professor of pathology in the Medico-Chirurgical College to the place made vacant by the resignation of Dr. E. B. Sangree.

PROF. WILLIAM THOMSON has resigned the chair of Ophthalmology in the Jefferson Medical College after twenty-four years connection with the school.

THE MEDICAL COUNCIL OF PENNSYLVANIA, which through the State Boards of Examiners, and Licensers, examines all physicians who wish to enter upon medical practice in this State, including graduates of our own schools, has adopted a rule that all students matriculating in medical colleges of the State of Pennsylvania, who intend after graduation to practice medicine in this commonwealth, will be obliged, on and after the term beginning in the fall of 1896, to provide themselves prior to matriculation with a certificate of preliminary examination. The preliminary examination which is now made compulsory and uniform in its application, requires attainment of a satisfactory average in the following branches: Arithmetic, grammar, orthography, American history and English composition. However, the diploma of a college, academy or seminary, normal school or high school, a teacher's permanent certificate, or a student's certificate of examination for admission to the freshman class in any college, shall be accepted in lieu of examination.

AT THE JUNE MEETING of the Philadelphia Chapter of the Alumni Association of the Jefferson Medical College, Dr. Emanuel J. Stout read a paper on "Extra-Genital Chancres;" Dr. J. Abbott Cantrell reported upon the "Clinical Aspects of the Tubercular Syphiloderm." Dr. John Lindsay read a communication on the "Treatment of Syphilis" which lead to a general discussion of the subject by Drs. Horwitz, J. M. Barton, Joseph Hearn, L. Wolff, J. Chalmers DaCosta, E. E. Graham, W. S. Jones and H. W. Stelwagon. A reception at the Penn Club and a social entertainment concluded the evening's exercises.

THE PHILADELPHIA COUNTY MEDICAL SOCIETY held its last meeting for the season June 27, when Dr. A. J. Downes exhibited his collapsible and removable bobbins for all forms of intestinal approximation. He also demonstrated a new continuous double-knot intestinal suture and a new abdominal retractor. Dr. Aug. A. Eshner read a communication entitled "Progress in Organotherapy."

THE TRUSTEES OF JEFFERSON MEDICAL COLLEGE on the 29th ult., elected Dr. George E. DeSchweinitz, Professor of Ophthalmology, to succeed Dr. William Thomson. Drs. D. Braden Kyle and W. S. Jones were made Clinical Professors of Laryngology and H. F. Harris, Assistant Professor of Bacteriology and Pathology, at the same meeting.

MENTAL AUTOMATISM.—The annals of the Coroner's office contain many interesting and remarkable cases of suicide which may be made to contribute something toward the solution of psychologic problems, and especially that of automatism and the imitative faculty or power of example in influencing human action. A middle-aged woman in this city, becoming disheartened, recently ended her life by the very unusual method of swallowing hydrochloric acid. A man living in the same neighborhood, after attending the funeral, purchased some of the same corrosive poison in a drug store on his way home and soon after reaching his own house swallowed the poison and soon afterward died. The connection of the two cases seems to have been merely accidental and there is nothing to warrant the idea that there had been any previous agreement between the two.

THE PUBLIC SERVICES.

Army Changes. Official List of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from June 20 to June 26, 1896.

Capt. Walter D. McCaw, Asst. Surgeon (Ft. Ringgold, Texas), is granted leave of absence for one month, to take effect on or about July 5.

Major Louis M. Maus, Surgeon (Ft. Sam Houston, Texas), is granted leave of absence for two months, to take effect on or about August 1, 1896.

Major Daniel M. Appel, Surgeon, is relieved from duty at Ft. Porter, N. Y., and ordered to the new post near Little Rock, Ark., for duty.

Capt. Aaron H. Appel, Asst. Surgeon, is relieved from duty as examiner of recruits at Chicago, Ill., and ordered to Ft. Porter, N. Y., for duty.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending June 27, 1896.

Asst. Surgeon S. B. Palmer, detached from the New York laboratory June 29.

P. A. Surgeon George Rothganger, detached from the "Independence," July 15, and ordered to the "Oregon."

Marine-Hospital Changes. Official list of changes of station, and duties of Medical Officers of the U. S. Marine-Hospital Service, for the twenty days ended June 20, 1896.

P. A. Surgeon W. P McIntosh, to proceed from Louisville, Ky., to Cincinnati, Ohio, to inspect unserviceable property; then to rejoin station, June 13, 1896.

P. A. Surgeon J. C. Perry, granted leave of absence for twenty days, June 20, 1896.

Asst. Surgeon C. H. Gardner, order of May 27, 1896, directing him to report for examination, is revoked, June 5, 1896.

Asst. Surgeon Rupert Blue, to proceed from San Francisco, Cal., to Angel Island quarantine station for duty, June 18, 1896.

Change of Address.

Alton, C. D., from Hartford, Conn., to Undercliff, Lake Placid, N. Y.

Busey, S. C., from Washington, D. C., to Atlantic Hotel Narragansett Pier, R. I., until Sept. 1, 1896; Brown, R. A., from Tupelo, Miss., to Paris, Tenn.

Donelson, C. P., from 818 Warren Avenue to 927 Monroe Street, Chicago.

Gates, W. S., from 1279 Wolcott St. to 2725 N. Lincoln Street, Chicago.

Henderson, H. C., from Chicago to Milford, Ill.

Isbester, R. T., from 636 Washington Boul. to 1923 Indiana Avenue, Chicago, Ill.

Meadows, J. E., from Lisbon to Manghan, La.

Polhler, F. T., from Minneapolis to Waseca, Minn.; Packard, J. H., from Devon to 26 So. 18th Street, Philadelphia, Pa.

Rhoden, J. C., from Ponca, Neb., to Elkpoint, S. Dakota.

Wilson, A. M., from 27 Union Depot to 229 Park Ave., Kansas City, Mo.

LETTERS RECEIVED.

Alport, Frank, (2) Minneapolis, Minn.; Atkinson, W. B., (2) Philadelphia, Pa.; Apollinaris Company, Ltd., The, (2) London, England; Acker, T. J., Croton-on-Hudson, N. Y.

Bodine, J. M., (2) Louisville, Ky.; Brown, Bedford, Alexandria, Va.; Belt, E. Oliver, Washington D. C.

Cleary, W. P., New York, N. Y.; Cox, C. C., College Park, Ga.; Chilton, E. Y., Howard Lake, Minn.; Cole, A. B., Washington, D. C.; Claiborne, J. Herbert, New York, N. Y.; Carpenter, J. G., Stanford, Ky.; Carroll, C. C., Poughkeepsie, N. Y.

De Hart, J. N., Round Lake, N. Y.; Davis, Stebbins, & Co., Boston, Mass.; David, Alfred, Atlantic Mine, Mich.

Edmonson, G. J., Maroa, Ill.

Fuerth, Geo., Detroit, Mich.; Farwell & Rhines, Watertown, N. Y.

Guthrie, W. A., Franklin, Ky.; Garceau, Edgar, Boston, Mass.

Hayes, R. H., Union Springs, Ala.; Holmes, Bayard, Chicago, Ill.; Howe, Lucien, Buffalo, N. Y.; Hill, Warren B., Milwaukee, Wis.; Hamilton, Hugh, Harrisburg, Pa.

Johnson, H. L. E., Washington, D. C.; Jonas, A. F., (2) Omaha, Neb.

Krause, Wm. C., Buffalo, N. Y.; Klingensmith, I. P., Blairsville, Pa.

Larkins, E. L., Terre Haute, Ind.; Lloyd, Wm. S., Philadelphia, Pa.; Lee, Elmer, Chicago, Ill.; Lord, J. P., Omaha, Neb.; Loeb, Hanau W., St. Louis, Mo.

Marshall, John S., (2) Kankakee, Ill.; Mouton, G. C., Rayne, La.; McCartney National Bank, The, Green Bay, Wis.; Moore, J. N., Atlantic Mine, Mich.; Montgomery, E. E., Philadelphia, Pa.; McCurdy, S. L., Pittsburg, Pa.; Mills, H. B., Philadelphia, Pa.; Moore, C. T., Marissa, Ill.

Nicholson, Wm. Perrin, Atlanta, Ga.

Prewitt, T. F., St. Louis, Mo.; Parke, Davis & Co., Detroit, Mich.; Parmele, Chas. Roome, New York, N. Y.; Pilcher, Jas. E., Columbus, Ohio; Paquin, Paul, St. Louis, Mo.

Ross, John D., Williamsburg, Pa.; Roy, Dunbar, Atlanta, Ga.; Ridlon, John, Chicago, Ill.; Rosenthal, Edwin, Philadelphia, Pa.

Sillman, W. A. B., Baltimore, Md.; Seidler, W. F., Newark, N. J.; Shoemaker, John V., Philadelphia, Pa.; Smith, Q. C., Austin, Texas; Schieffelin & Co., New York, N. Y.; Savage, A. D., New York, N. Y.; Slaughter, A. W., (2) Green Bay, Wis.; Schwalbe, J., Berlin, Germany.

Tiffany, Flavel B., Kansas City, Mo.

Whittaker, Thos., New York, N. Y.; White, J. L., Bloomington, Ill.; Wyckoff, R. M., (2) Brooklyn, N. Y.; Waxham, F. E., Denver, Colo.; Ward, M. R., Pittsburg, Pa.; Whitford, Wm. Chicago, Ill.; Wilkinson, A. D., Lincoln, Neb.; Wood, H. D., Angola, Ind.